

THE
HANDY HORSE BOOK.

A MANUAL FOR EVERY AMERICAN
HORSE-OWNER.

BY

C. E. THORNE, AND A. T. WILSON,
EDITOR FARM AND FIRESIDE. VETERINARY SURGEON.

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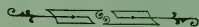
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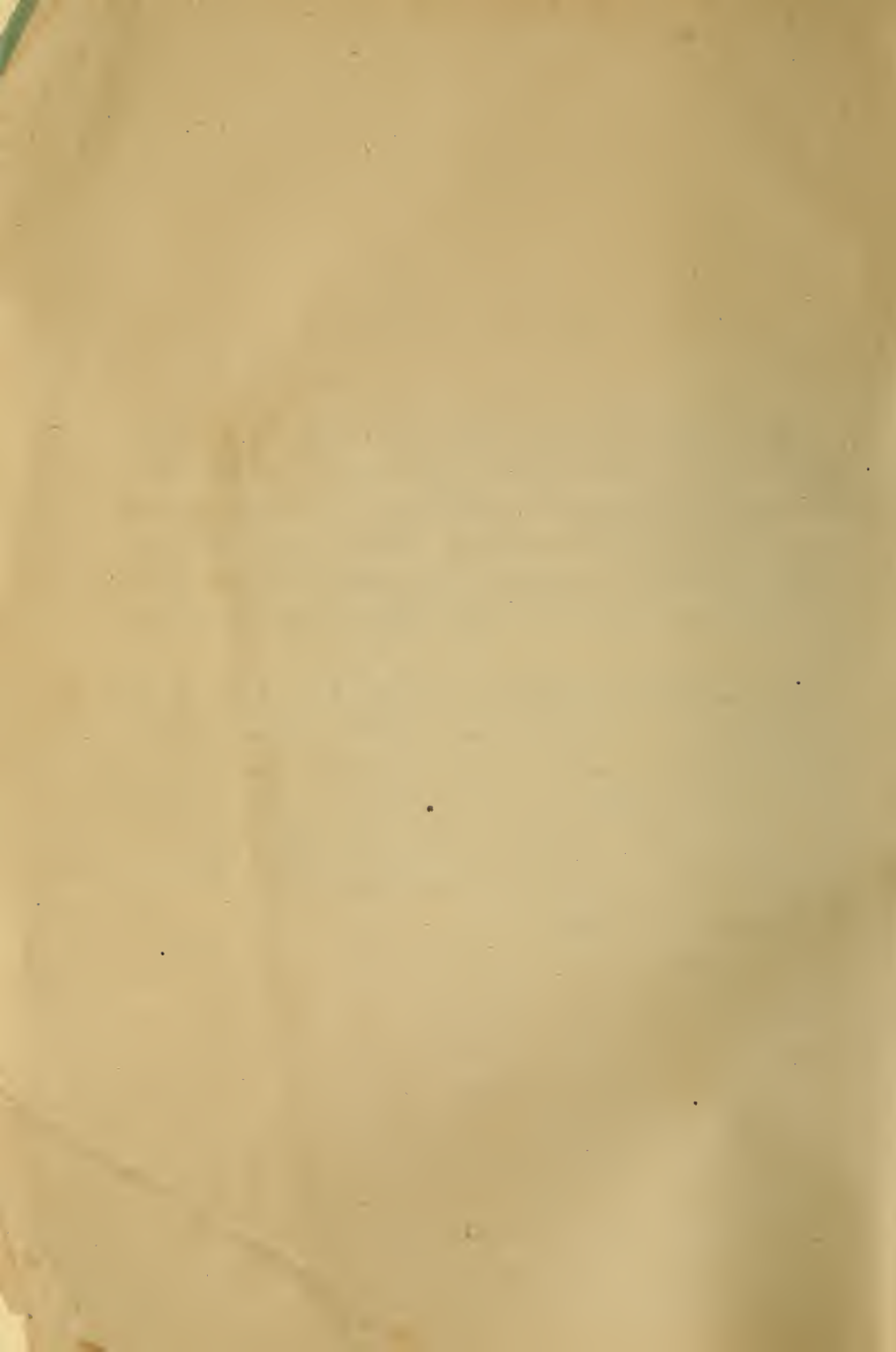
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PREFACE.

In the compilation of my portions of this book it has been my endeavor to collect, in convenient form, such facts relating to the history and management of the horse as I have often wished to have access to in my own farm-life. While I can lay little claim to originality in this compilation, I hope that my experience may have been such as to salt the whole with the savor of practicality.

It will be seen that throughout my part of the book, as well as Dr. Wilson's, no attempt has been made towards an exhaustive discussion of the points considered. For such discussion the reader must be referred to more extensive or more specialized works, this book being designed, as its name implies, simply as a *handy* manual for the ordinary horse-owner, and as such I hope it will be found serviceable.

C. E. T.



PART I.

HISTORICAL.

From the legends of the rocks we learn that the elevation of the lands which had formed the bottoms of the oceans of the Cretaceous period was very soon followed by the advent of hoofed animals, already showing the differentiation into Artiodactyla, or even-toed, and Perissodactyla, or odd-toed, which continues to be a most important point in classification. Of the latter class the earliest forms to which the modern horse can be traced, that have as yet been found, have come from the fossil beds of New Mexico, Utah and Wyoming, belonging to the Eocene period; but as yet the evidence that similar forms may not exist in other parts of the world is only negative, since there are immense tracts in Asia and Africa, where the paleontologist is as yet unknown.

The earliest form of the horse thus far discovered—the *Eohippus*, of Marsh, was not larger than a fox, and had four toes, with rudiments of a fifth. In succeeding forms the toes disappeared and the size increased, until the horse which accompanied man in his advent upon the world of history was an animal probably much resembling the wild pony of the present day, with all the toes obliterated except the central one, corresponding to the middle digit in man.

Zoologists place the horse in the genus *Equus*, species *caballus*. This genus also includes (2) the domestic ass (*E. asinus*); (3) the Asiatic wild asses, roaming from Syria to the frontiers of China, and forming probably but a single species (*E. hemionus*), though divided by some zoologists into the Syrian wild ass (*E. hemippus*), the Onager (*E. onager*), from Persia, and the Kiang, or Dzeggettai (*E. hemionus*), of the high table-lands of Thibet; (4) the Quagga (*E. quagga*); (5) the Dauw, or Burchell's Zebra (*E. Burchellii*), and (6) the Mountain Zebra (*E. Zebra*); the last three belonging to

Africa, and being distinguished from each other by the Quagga having the dark stripes limited to the head, neck and shoulders, upon a brown ground-color, while the Dauw has a white ground-color, with the stripes extending over the body and upper part of the limbs, and the Mountain Zebra shows a still stronger contrast between the stripes and the white ground-color, the former extending to the feet. This species is confined to southern Africa, and is becoming extinct, owing to the encroachments of civilization.

These six modifications of the horse type are all sufficiently distinct to be regarded as separate species. They are not so widely separated but that each will interbreed with any of the others, but the produce of such interbreeding is in every case a true hybrid; that is, incapable of perpetuating its kind, although there are some instances of female mules breeding with males of either the horse or the ass.

Of these species but two, and these the two bearing the least resemblance to each other—the horse and the ass—have been brought into domestication. Of the time and place of this domestication we have no tradition. A few scattering hints have been obtained from geology; from that picture-writing by which primeval man sought to perpetuate his ideas on bone, or horn, or rock; and from a few indistinct allusions in the oldest forms of written language.

As before stated, the earliest paleontological remains of the horse thus far found have occurred in America, and from the Eocene *Eohippus* it is traced through various modifications to forms differing but slightly from the horse of to-day; yet, when America was opened to civilization, none of these forms were represented in its living fauna, notwithstanding the fact that the broad plains of both continents were perfectly adapted to the necessities of this animal, as shown by the fact that they soon became the grazing ground of immense herds of wild horses, the produce of individuals which had escaped from domestication.

From the natural adaptitude of the plains of southern Africa to the habits of the horse, and from the close resemblance in

form of the other members of the genus now existing there, we would naturally expect to find in that country his original home. The evidence upon this point, however, is not conclusive. At present no wild horses are known to exist either in Africa or elsewhere, except as descendants of those which have escaped from domestication.

The earliest historical references to the horse occur in words of Sanskrit origin, in the Egyptian hieroglyphics, and in Hebrew history. The chronology of these references is so obscure that it is impossible to assign any dates to them, but they leave no doubt that the horse was in domestication among the Hebrews and Egyptians from sixteen hundred to two thousand years before the Christian era, and they cause the surmise that he was probably brought, already domesticated, with the Aryan races who, at about this period, began that westward march of civilization which is not yet ended.

In view of the perfection to which the modern Arabian horse has been brought, it has been conjectured by some that Arabia was his original home; but that country has long been so barren that the horse would not have prospered without human care, while he seems to have been comparatively unknown there in early times. Solomon appears to have mounted his cavalry from Egypt, and it is not until the fifth century, A. D., that we have any evidence of the possession of horses by the Arabians, while even in Mahomet's time they were not abundant.

Xenophon, writing in the fifth century, B. C., describes, in the horse of Greece, an animal which would to-day be recognized as a good horse. The horse of Rome is supposed to have been inferior to that of Greece, from the fact that the Roman cavalry proved unequal to that of Macedonia and Persia, notwithstanding the superiority of the Roman infantry.

In Great Britain and western Europe we have a series of evidences which, apparently, take up equine history near the point where it is dropped by the fossil beds of America. These evidences exist in the debris forming the floors of the caves for the possession of which, as dwelling places, primeval man disputed

with the nyæna and great cave bear, and in whose lowest strata the bones of these animals, as well as of the mammoth rhinoceros and other animals of whose existence in those regions no other tradition is left, are mingled with those of the horse, and with human bones and implements of war and the chase. In these caves we have not only the evidence furnished by the commingling of these bones, but even at that early date the instinct of the artist had been born, and on bits of bone, elephant's tusk, deer's antlers, etc., have been found rude sketches of several of these animals, the horse included. From these sketches we learn that the horse of the cave-dwellers bore a considerable likeness to the wild pony that roams the Russian steppes to-day.

Above the layer of debris which covers these remains exists another from which the previous fauna has mainly disappeared, but we still find the bones of man and horse, surrounded now, however, with those of the domestic dog, pig, goat and ox, and the badger bear, wild boar and other wild animals of the present fauna.

The man who first inhabited these caves seems to have been of the Eskimo type, to have had no domestic animals, and to have subsisted wholly by the chase. The horse was, therefore, to him only an object of food. With the changed climatic conditions under which the mammoth and hyæna gave place to the ox and pig, the Eskimo disappears and his place is supplied by a type of men which is thought to be still represented in the remnants of the Iberic races now existing in the Basque provinces of Spain, and which were driven to the westward and almost completely annihilated by the Celtic offshoots of the great Aryan stock, who were found occupying the land by Cæsar, and who were in possession of horses which they rode and harnessed to chariots.

No doubt these Celts had carried with them in their westward migrations some of the animals which had been domesticated in their eastern homes, and most probably the horse of the neolithic cave-dweller now received an infusion of eastern blood.

With the advent of the Romans, however, more definite history begins, and we may be sure that the native mares were crossed

with the Roman remounts. We cannot be so sure, however, that this cross was always an improvement, since these remounts were obtained from all quarters of the world, while the Romans never manifested much concern for the improvement of their horses.

The Jutes and Saxons were maritime peoples, and the few horses which they brought with them to assist in their inland excursions were probably not superior to those already in Britain. But the coming of William the Conqueror opened a new era in the equine as well as the human history of England, in the importation of the horses of Normandy and Spain. From this time there were frequent importations of foreign blood. The crusades furnished opportunities for the introduction of the blood of Turkey, Arabia and Barbary, which has since become so celebrated; but the small horses of those regions were not suited to the carrying of an armor-clad knight, and consequently these only found favor among monks and ladies, while the soldier of the period preferred the powerful horses of Normandy and Flanders, and King John is recorded as having imported a hundred Flemish stallions.

That the English horse had early attained a valuable character is shown by the fact that Edward III., in the fourteenth century, forbade their exportation, a prohibition which was continued by Henry VII. (1485-1509) in the case of stallions, but relaxed in that of mares above two years old. Gelding is believed to have had its origin in this reign, the object being to preserve and improve the quality of the English breed by preventing the use of inferior animals as breeders. Henry VIII. carried this idea so far as to forbid the grazing on the commons of certain counties, of any entire horse that was of less height than fifteen hands. Any one was at liberty to seize such a horse, and there were those whose duty it was to measure horses, under a heavy penalty for refusal. It was further required that all forests and public commons should be driven within fifteen days of Michaelmas, and all horses, mares or colts not giving promise of becoming serviceable as breeders, were to be killed.

Up to this time the horse had been little used as a draft animal ;

carriages have not yet been invented, and the operations of agriculture were chiefly performed by oxen, hence the horse had been bred almost exclusively with reference to the carrying of the heavily armored soldier, the steed also being covered with mail, so that the exigencies of war had caused the laying of the foundation of those breeds of massive horses which are now so valued in agriculture. With the introduction of carriages, however, a demand arose for a lighter and more active breed, a demand which was increased by the discovery of gunpowder, and the consequent disuse of armor. In response to this demand, attention was turned to the heretofore neglected breeds of the South, where the wild Moor, Arab and Turk, untrammelled by armor, never using their horses for draft, but valuing fleetness and endurance more than aught else, had produced such lithe and supple animals as were now needed to modify the heavier northern forms for future use under the saddle or in light harness.

THE THOROUGHBRED.

The first horse of southern blood imported into England for breeding purposes, of which we have any authentic account, was an Arab stallion, brought from Constantinople, by a Mr. Markham, and sold to James I. early in the seventeenth century, for five hundred guineas. This horse, known later as the "Markham Arabian," did not become popular, either on account of prejudice or from actual lack of merit. Charles I. also favored the introduction of the southern blood, but little progress was made until Charles II. came to the throne. This king sent his master of the horse abroad to purchase a number of foreign horses and mares for breeding purposes, and the mares thus introduced became known afterwards as the "Royal mares" of the Stud Book. These importations were continued by James II., so that the seventeenth century witnessed the foundation of a new breed, based chiefly, no doubt, upon the cross between the southern horse and the English descendant of the earlier crosses of Norman and Flemish stock, but also containing some pure southern blood.

The beginning of the eighteenth century, however, witnessed the appearance in England of the three horses to which the modern thoroughbred race-horse more directly traces his lineage. These were, (1) the Byerly Turk, of whose early history nothing is known further than that he was used by Captain Byerly in King William's wars in Ireland; (2) the Darley Arabian, a genuine Arab, imported from Aleppo by a brother of Mr. Darley, of Aldby Park, Yorkshire, about the end of the reign of William III., or the beginning of that of Anne (1700-1706); and (3) the Godolphin Arabian, or Barb, a horse supposed to have been presented by the Emperor of Morocco to Louis XIV., but which was so little valued in Paris that he was set to drawing a cart, at which occupation he was discovered by a Mr. Coke, by whom he was sent to England, where he finally came into possession of the

Earl of Godolphin. Even yet he was not appreciated, and was only used as a teaser; finally, however, he was allowed to cover a mare (Roxana) which the other horse had refused, and the produce of this union (Lath) became one of the best horses of the day. The Godolphin is supposed to have lived from 1724 to 1753. He is represented as having a remarkably high crest, and very round and drooping quarters. He was of a brown-bay color and about fifteen hands high. These horses being bred to mares which already contained more or less admixture of southern blood, from the previous importations referred to, produced a few horses of exceptional merit, either as racers or as sires of racers, and it soon became manifest that in this anglicized southern blood lay the greatest promise of speed and endurance. It was not, however, until the end of the century that an attempt was made to systematically preserve the pedigrees of animals of this strain; by this time, of course, there were many false and inaccurate pedigrees claimed, and in order to reduce this confusion to system, a Stud Book was commenced in 1791, which included such pedigrees as could be established from the racing calendars, sale papers, and traditions which were then accessible. The first volume of the Stud Book appeared in 1808. As it claimed to give pedigrees extending back to the beginning of the eighteenth century, there were, of course, some inaccuracies, especially with regard to dates, but it is now accepted as the most reliable authority with regard to the history of the racing or thoroughbred horse.

It will be seen from the above that this term "thoroughbred" is but of comparative significance, for there is probably no pedigree which can be traced back to parents of southern blood on both sides without showing at some point an admixture of some other blood, in the statement "dam unknown"—a statement which generally means that the dam was of northern blood; while, if these pedigrees could all be traced back to the importations of the close of the seventeenth century, they would still only show that the "thorough" breed was founded upon a mongrel breed, composed of Barb, Arabian and Turk, tempered with the bloods of Flanders, Normandy and England. By this

fusion of bloods, size and strength have been added to the form and courage of the southern horse; the thoroughbred of to-day averaging a hand taller than the Turk—which is the largest of the southern breeds—and possessing such superior fleetness that he is able to distance him, even when the latter carries the lighter weight.

The thoroughbred was originally bred for running, and as a runner he still excels all other breeds, but for actual service in the every-day affairs of life this gait is of little value, however useful it may be to the wild Bedouin of the desert. The smooth, compact frame of the thoroughbred horse, however, and his speed and great endurance, have been extremely valuable factors in the modifying of the ordinary breeds to suit the demand for a light business or pleasure horse, and in this he has served and is serving a very useful purpose.

The shape of the race-horse is variable, and he is said to win in any form, but it is essential to success on the race-course that every muscle should be fully developed, and yet without surplus flesh; that the bones should be light, yet strong; that the lungs and air passages should be large, and the whole form so harmonized that there shall be no superfluous weight of bone, tendon or muscle. Such a form is most consistent with the greatest neatness and beauty, consequently many thoroughbreds are of most beautiful contour. This is not universally the case, some successful racers having been large framed, heavy headed, and plain looking, but such are exceptions to the general rule.

The color of the thoroughbred is generally bay or chestnut, varying to black, gray and roan; the latter colors, however, being very unusual. His skin and hair are firm, and the veins which underlie the skin more prominent than in other breeds. His size ranges from fifteen to sixteen and one half hands—the former being considered small, and the latter rather large. The American thoroughbred, however, excels his English progenitor in this respect.

THE TROTTING HORSE.

Three principal breeds of trotting horses have been developed since the closing years of the eighteenth century; one, known as the Norfolk trotters, originated in England, 1790-1800; the second, the Orloff trotters, was established in Russia through the energy and skill of Count Alexis Orloff, at about the same period; and the third, the American trotting horse, was founded by the English thoroughbred, Messenger, foaled in England in 1780, and imported to Philadelphia in 1788, where he was kept for stud service several years, ending his life in the vicinity of New York in 1808.

This celebrated horse was a gray, fifteen hands, three inches high, and stoutly built. He was rather upright in the shoulders and low on the withers, and had a short, straight neck and large, bony head. His loins and hind-quarters were very muscular, his windpipe and nostrils of unusual size, his joints large, his limbs medium sized, but flat and clean.

Messenger was imported and used in the stud simply as an ordinary thoroughbred horse. At that time trotting was but little in vogue, since the carriages of the day were too cumbersome for comfort, either to horse or rider, and hence the favorite method of locomotion was in the saddle, for which method the trotting gait is but little adapted; consequently it is not known whether Messenger himself possessed more than ordinary speed as a trotter, nor is our knowledge of his immediate descendants more complete. It was not until his grandchildren came upon the turf that this peculiar quality of his blood was discovered.

The sons of Messenger, to whom most of the fastest trotters of to-day trace their lineage, were Plato, Engineer, Commander, Why-Not, Mount Holly, Mambrino, and Hambletonian. Of these the most celebrated was Mambrino, who was a thoroughbred, a bright bay, sixteen hands high, and, like his sire, upright



TROTting HORSE (THORNDALE.)

Property of Edwin Thorne, Esq., Millbrook, Dutchess County, N. Y.



in the shoulders. He was rather a coarse horse, with a rapid walk and trot, and running speed of the first order. He was the sire of Abdallah, who also traced his lineage to Messenger on the side of his dam. From Abdallah, in turn, are descended many of the most celebrated trotting horses, including Rysdyk's Hambletonian and Mambrino Paymaster, sire of Mambrino Chief, sire of Lady Thorne, Mambrino Pilot, Bay Chief, etc. Abdallah was foaled in 1826, the property of Mr. John Treadwell, of Jamaica, Long Island. In 1840 he was sold to Mr. John W. Hunt, of Lexington, Kentucky, but was brought back the next year, and died in 1852.

Hambletonian, the next in celebrity to Mambrino of the sons of Messenger, was also thoroughbred. He was a dark bay, fifteen hands, one inch high, and beautifully formed. He was the sire of Topgallant, Whalebone, Sir Peter, Trouble, and Shakspeare, all of whom ranked among the best of American trotters.

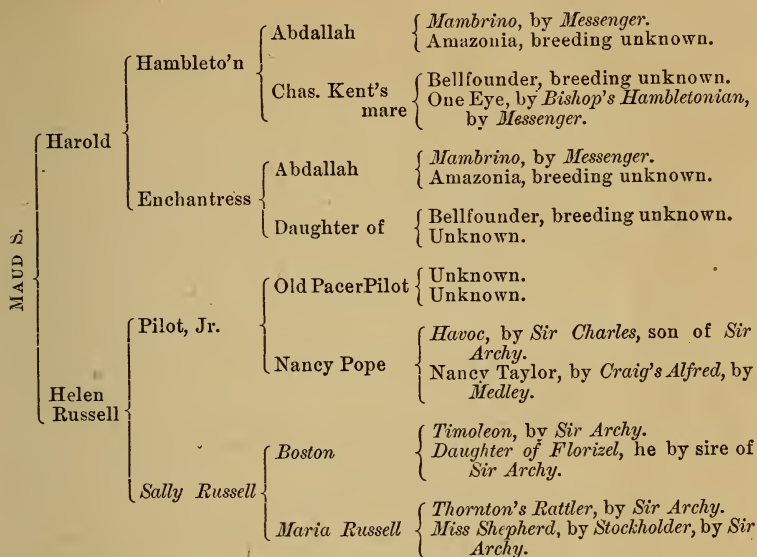
The other sons of Messenger have won less renown through their descendants, although many valuable horses are descended from them. It is generally found that horses which show unusual speed as trotters, if their pedigrees can be traced back far enough, are descended, in some line, from Messenger.

One of the most celebrated of the later descendants of Messenger was the horse called Rysdyk's Hambletonian, from being the property of William H. Rysdyk (pronounced Risedick), of Orange county, New York. This horse was foaled in 1849 and died in 1876. He was the sire of one thousand, three hundred and twenty-four foals. For the last five or six years of his life the charge for service was one hundred dollars cash in advance, and four hundred more when the mare was known to be with foal. His total fees amounted to more than \$200,000. This horse was the sire of Dexter, of Alexander's Abdallah, who was the sire of Goldsmith Maid, and of many others more or less noted for their speed, but of his thirteen hundred and twenty-four foals only thirty have trotted in 2:30 or less, consequently but a small proportion of his foals were worth their cost.

Another class of speedy trotters has been bred from horses that were originally fast pacers, and were supposed to have descended from a breed known many years ago as the Narragansett Pacers, which was supposed to be of Spanish origin. In color the horses of this origin are frequently roans or duns, thus showing a different ancestry from the thoroughbred, but they equal the thoroughbred in endurance. Another line of pacers which has done much toward the improvement of the American trotting horse was headed by a black pacing and trotting horse, of unknown ancestry further than that he was called a Canadian horse, who was foaled about 1826 and died about 1855. This horse was known as Old Pacer Pilot. He was very fast, both as a pacer and trotter, and sired some very fast trotters, who owed none of their speed to Messenger blood. His record as a pacer is 2:26, with a weight on his back of one hundred and sixty-five pounds. Among the fast trotters who have been converted from the pacing gait is Smuggler, whose record of 2:15 $\frac{1}{4}$ is the lowest ever reached by a stallion. The celebrated Maud S., whose record of 2:10 $\frac{1}{4}$ is the lowest ever reached by any trotter, traces her lineage on the side of her sire to Messenger, through Old Abdallah, and on the side of the dam to Old Pacer Pilot. This wonderful mare also numbers among her ancestry the horse Bellfounder, a horse of unknown lineage, but whose descendants have in many cases proved valuable as trotters. He was foaled in England about 1817, and was brought to Boston in 1823. His appearance indicated that he was nearly thoroughbred. It is only when his blood has been mingled with that of Messenger that anything more than a good carriage gait has been developed. Maud S. was bred by A. J. Alexander, of Kentucky, being foaled March 28, 1874. She is a chestnut, full fifteen and three fourths hands high, and weighs, in trotting condition, 940 pounds. As a yearling she was sold to Captain James Burgher (since deceased), of Cincinnati, for \$325, and at three years old to Captain G. N. Stone, of the same city, for \$350. As a four-year-old, Maud S. made, at Lexington, Kentucky, October 26, 1878, the unprecedented time of 2:17 $\frac{1}{2}$, and was immediately sold to W. H.

Vanderbilt for \$21,000. On the 11th of August, 1881, this time was lowered to 2:10 $\frac{1}{4}$, being the fattest trotting time ever made.

We present below the pedigree of Maud S., the names of thoroughbreds appearing in italics :



It will be seen from the preceding that the trotting horse is not necessarily a thoroughbred, although a connection on one side or both with the *Messenger* family of thoroughbreds seems essential to the greatest speed in trotting.

In point of usefulness, the trotter must be regarded as far superior to the thoroughbred, since his gait is one of great value in many kinds of business, and the improvement which has been affected in it by the wide diffusion of his blood throughout the common stock of the country has been very great. As an indication of the advance which has been made in this direction, a recently published table which gives the names of all horses that have trotted a mile in 2:25 or better up to the close of 1879,

includes three hundred and seventeen trotters, all of which, except twenty-five, were living when the table was published. This shows that this rate of speed was very unusual only a horse-generation ago, but it is now so common that a less rate is not considered especially promising.

The following are a few of the fastest trotting and pacing records up to July, 1880 :

TROTTING IN HARNESS.

- One mile, first heat—St. Julien, Oakland Park, Cal., Oct. 25, 1879, 2 m., $12\frac{3}{4}$ s*
 One mile, second heat—Rarus, Hartford, Conn., Aug. 23, 1878, 2 m., $13\frac{1}{2}$ s.
 One mile, third heat—Rarus, Buffalo, N. Y., Aug. 3, 1878, 2 m., $13\frac{1}{4}$ s.
 One mile, fourth heat—Lula, Rochester, N. Y., Aug. 14, 1875, 2 m., 17 s.
 One mile, fifth heat—Smuggler, Cleveland, Ohio, July 27, 1876, 2 m., $17\frac{1}{2}$ s.
 One mile, sixth heat—Goldsmith Maid, Hartford, Conn., Aug. 31, 1876, 2 m., $19\frac{3}{4}$ s.
 Two miles—Flora Temple, Eclipse Course, Long Island, Aug. 16, 1859, 4 m., $50\frac{1}{2}$ s.
 Three miles—Huntress, Prospect Park, Brooklyn, L. I., Sept. 23, 1872, 7 m., $21\frac{1}{4}$ s.
 Four miles—Trustee, Union Course, L. I., June 13, 1849, 11 m., 6 s.
 Five miles—Lady Mack, San Francisco, Cal., April 2, 1874, 13 m.
 Ten miles—Controller, San Francisco, Cal., Nov. 23, 1878, 27 m., $28\frac{1}{4}$ s.
 Fifteen miles—Girda, San Francisco, Cal., Aug. 6, 1874, 47 m., 20 s.
 Twenty miles—Capt. McGowan, Boston, Mass., 1865, 58 m., 25 s.
 Fifty miles—Ariel, Albany, N. Y., 1846, 3 h., 55 m., $40\frac{1}{2}$ s.
 One hundred miles—Conqueror, Long Island, Nov. 12, 1853, 8 h., 55 m., 53 s.

PACING.

- One mile in harness—Sleepy Tom, Chicago, Ill., July 25, 1879, 2 m., $12\frac{1}{4}$ s.
 One mile under saddle—Billy Boyce, Buffalo, N. Y., Aug. 1, 1868, 2 m., $14\frac{1}{4}$ s.
 One mile to wagon—Pocahontas, June 21, 1855, 2 m., $17\frac{1}{2}$ s.
 Two miles under saddle—Bowery Boy, Long Island, 1839, 5 m., $4\frac{1}{2}$ s.
 Two miles in harness—Hero, May 17, 1853, 4 m., $56\frac{1}{2}$ s.
 Three miles under saddle—Oneida Chief, Beacon Park, N. J., 1843, 7 m., 44 s.
 Three miles in harness—Harry White, San Francisco, Cal., Aug. 8, 1874, 7 m., $57\frac{1}{4}$ s.

With regard to the comparative merits of thoroughbreds and trotters as useful horses, we quote with approval the following

*Since lowered to $2:11\frac{1}{4}$, and beaten by Maud S. in $2:10\frac{1}{4}$.

extract from a letter written by a correspondent of the *National Live Stock Journal*:

"It is a well known fact, that the sole object aimed at by breeders of thoroughbred horses for centuries past has been *adaptation to racing*. Everything has been sacrificed to this one object. Tractability, docility, sweetness of temper, beauty of form—in short, every thing that does not have a direct bearing upon the value of the horse for racing purposes, has been entirely lost sight of by breeders of thoroughbreds, not only in this country, but in England; and the result is, that the infirmities of temper alone, which have been part and parcel of this race, are so great as to render most thoroughbreds utterly unfit for the farmers' use, and dangerous even as a cross. The theory is a beautiful one, that all excellencies come from the thoroughbred, and that to engraft stamina and stoutness upon any breed, this cross must be used. Gentlemen of the old school, who have come down to us from a former generation, never grow weary of sounding the praise of the thoroughbred, and always prescribe this cross as the panacea that will cure all the defects of modern breeds; but I am certain that those who hold such extravagant notions as to the virtue of this cross have been voluntarily deaf and blind to all that the last twenty years have taught us.

"There is excellence in the thoroughbred, but it is not without a great deal of alloy; and I am firmly of the opinion that our best bred trotting strains have as much of it as is profitable for the farmer's horse to possess. Indeed, I am decidedly of the opinion that our American trotting horses are quite as highly endowed with stamina and endurance as are the thoroughbreds; and when to this we add the other qualities that adapt them to useful purposes, there is no comparison. I might cite numerous cases, I might name score of trotters that have manifested powers of endurance upon the turf year after year, that would put to shame anything that could be instanced from the running turf, and most of them have been good for something besides the use of the gambler—the only man who has use for a race-horse. But it is no use to waste space with names. Every horseman is

"It seems to me to be a fact patent to all observant men who are of this generation, and not of the past, that we have in the American trotting horse the very highest product of the breeder's art in all the useful qualities, and that in leaving this and going *back* to the thoroughbred we voluntarily shut our eyes and refuse to accept the benefit of what has been done for us by former generations.

"That witty writer, Oliver Wendell Holmes, has pretty fairly expressed the relative uses to which thoroughbreds and trotters have been bred, in the following caustic paragraph: 'The racer is incidentally useful, but essentially something to bet upon, as much as the thimble-rigger's "little joker." The trotter is essentially and daily useful, and only incidentally a tool for sporting men. * * * Wherever the trotting horse goes, he carries in his train brisk omnibuses, lively bakers' carts (and therefore hot rolls), the jolly butcher's wagon, the cheerful gig, the wholesome afternoon drive with wife and child—all the forces of excellence, except truth, which does not agree with any kind of horse flesh. The racer brings with him gambling, cursing, swearing, drinking, the eating of oysters, and a distaste for mob-caps and the middle-aged virtues.'

"It is possible that Dr. Holmes may have drawn it a little strong, but still he has given expression to what everybody knows to be the truth—that running horses have for generations past been bred for sporting purposes, while the trotter is eminently the product of our utilitarian age."

THE ORLOFF TROTTERS.

The following history and description of this breed of horses, which has recently attracted considerable attention in America, is taken from the *National Live Stock Journal*, of Chicago, for July, 1877:

"The Orloff horse takes its name from Count Alexis Orloff Tschismensky, an enthusiastic horseman of Russia, who, as early as 1775, imported from Arabia a gray stallion named Smetanxa, said to have been of unusual size and strength. A Danish mare was bred to this imported Arabian stallion, and the produce was a horse known as Polkau 1st. From a union of this half-blood with a Dutch mare sprang a stallion known as Bars 1st, who is generally known as the progenitor of the Orloff race of trotters. The fame of this quarter-blood, Bars 1st, was chiefly perpetuated through his sons, Lubeznay 1st, Lebed 1st, and Dobroy 1st.

"Count Orloff and his successor, V. T. Shiskin, devoted themselves assiduously to the improvement of these horses, selecting their stallions exclusively from the foundation above alluded to, but resorting frequently to English and Dutch mares of known excellence; so that the Orloff trotter, like the American, is of a mixed origin; and neither the Arab, the Barb, nor the English thoroughbred, can claim exclusive paternity in either case.

"Selection and crossing with a view to adaptation for a specific use has accomplished the work of creating in both countries a race of trotting horses. Count Orloff was an intelligent enthusiast in the business—as all successful breeders have been—and he persistently refused to part with any of his entire horses, preferring that he alone should dictate the choice of sires to be used to perpetuate and improve the race. After his death the stud was scattered—a considerable portion of it passed into the possession of the crown, several private studs were established and a stud book was instituted to aid in the work of keeping the race

free from further admixture, although with the Russians, as with us, the question is not very well settled as to what constitutes the best trotting pedigree, and purity of blood is rather a vague and indefinite term when applied to the Orloff as well as to the American trotter. The count had been an enthusiastic patron of the race course, as a means of developing and testing the powers of his horses, and since his time the government has given its powerful aid to promote the same object, not only by establishing breeding studs, but by furnishing more than one half of the prize money that is contested for at these trotting races, which have been held regularly in that country for the past fifty-three years. Russian trials of speed are regulated by law, and the driver or owner who violates any of the rules which have been laid down to secure fair contests, is liable to take an uncere- monious trip to Siberia at government expense—a punishment that, as might be supposed, is much more effectual in suppressing fraud than is that of an edict of expulsion issued by our National Trotting Association.

“We have before us, as we write, a statement of the best time at all distances in Russia each year, for fifteen years past, from which it would appear that no improvement has been made in the speed or endurance of the Orloff trotter during the last five years. The fastest time ever made for one verst (1,350 feet) was 1:40, by Potieshnoy in 1869, which rate of speed, if kept up for one mile, would be a very little below 2:31. This rate of speed has never been reached by any other Russian horse, the nearest approach to it being 1:42 $\frac{1}{3}$. The same horse has the best record at three versts, being 5:00, equal to two miles in 5:01 $\frac{3}{4}$. This appears to have been an exceptional case, however, as the next best performances are three versts in 5:06 once, and 5:07 twice. The best time for four and a half versts is 7:52, equal to 7:54 $\frac{3}{4}$ for three miles. For seven and a half versts the best time is 13:49, equal to 13:56 $\frac{3}{4}$ for five miles. For thirty versts the best time is 1:08.30, equal to twenty miles in 1:08.53 $\frac{1}{2}$, which is, by over three minutes, the best performance by a Russian horse at that distance.

"Comparing these records with those of our American trotters, we find the following:

BEST RUSSIAN TIME.

One Mile.....	2:31
Two Miles.....	5:01 $\frac{3}{4}$
Three Miles.....	7:52 $\frac{1}{2}$
Five Miles.....	13:56 $\frac{3}{4}$
Twenty Miles.....	1:08.53 $\frac{1}{2}$

BEST AMERICAN TIME.

DIFFERENCE.

One Mile.....	2:14	17	Seconds.
Two Miles.....	4:50 $\frac{1}{2}$	11 $\frac{1}{4}$	"
Three Miles.....	7:21 $\frac{1}{4}$	31 $\frac{1}{4}$	"
Five Miles.....	13:00	56 $\frac{3}{4}$	"
Twenty Miles.....	58:25	10:28 $\frac{1}{2}$	"

"From the foregoing, the superiority of American trotters at all distances is very clearly shown; as we do not share in the often-expressed opinion that our system of training, our tracks, and our vehicles are materially better than the Russian, about 700 American trotters have beaten the best one-mile time made in Russia; and although two-mile races are not common in this country, the exceptionally fast time of 5:01 $\frac{3}{4}$ for that distance made by Potieshnoy has been beaten by nearly all of our great trotters; and we have no doubt but that we have fifty trotters in training to-day that are capable of beating that time by several seconds. No Orloff trotter has ever succeeded in trotting twenty miles within an hour by nearly nine minutes, while five American horses have compassed that distance within the hour. Another point of contrast, in which the American trotter shows at a great advantage over his Russian competitor, appears to be in campaigning properties. The oldest reported Orloff winner is twelve years. Goldsmith Maid is in her prime at twenty. Pietel, the most noted Orloff campaigner, was a winner for four successive years; the Maid has been a winner for thrice that length of time, while most of our great trotters have steadily improved until they were fifteen or sixteen years of age.

"It is also worthy of note, that while the Russian trotter appears to have attained his maximum of speed several years ago the improvement on the part of our American horses in this

respect, within the past ten years, has been truly wonderful. The records of the Buffalo Trotting Association, since 1866, make the following showing:

YEAR.	AVERAGE TIME.	YEAR.	AVERAGE TIME.
1866.....	2:38½	1872.....	2:26
1867.....	2:34½	1873.....	2:26½
1868.....	2:31¾	1874.....	2:24½
1869.....	2:29¼	1875.....	2:25⅔
1870.....	2:28¾	1876.....	2:23
1871.....	2:25¾		

“Here we see that the average time of the heats has been reduced from 2:38½ in 1866 to 2:23 in 1876, showing an average increase in speed of about one and one half seconds per year. Certainly the showing for speed and endurance of the Orloff trotter does not compare favorably with the American, although the former undoubtedly possesses both of these qualities to a high degree. It is claimed, however, that in beauty of form the Orloff is greatly the superior of our American production; but here, again, we must be permitted to put in a demurrer; for, if the animals that we have seen may be taken as fair specimens of the breed, the facts are certainly the reverse of this statement. Our breeders will certainly object to the prevailing color of the Orloffs, as, upon an analysis of the winners in that country, we find that 55 per cent. are grays, 24 per cent. blacks, 14 per cent. bays or browns, and 6 per cent. light bays.”

THE DRAFT HORSE.

We have referred to the heavy horses of Normandy and Flanders as being the parent stock from which have sprung the draft breeds of England, as well as those of modern France. Undoubtedly the fertile plains of those regions, with their abundant supplies of food, had done much toward the development of the bulky frames of their breeds of horses; but in this development nature had probably been assisted by the early monasteries, whose concentrated wealth and comparative security from the vandalism which was so rampant during the middle ages, not only drew within their walls men whose peaceful inclinations and desire for the spiritual and temporal advancement of their fellows unfitted them for the turmoils of the ordinary life of the period, but gave them the opportunity to pursue their inclinations in various ways.

Thus we not only owe to these establishments the preservation of literature and art during a period when kings and nobles considered the pursuit of learning, even to the extent of being able to read and write, an employment fit only for those too weak or effeminate to follow the "nobler" pursuit of war, but the vast landed estates attached to most of the monasteries, and their comparative immunity from the devastations of war, gave opportunity (which was undoubtedly sometimes improved) for the improvement of the domestic animals which were kept upon them.

But however this may be, there can be no doubt that much of the great size, the powerful frame and the quick action of the best draft horses of to-day is due to the demand of the armored knight of the feudal ages for a horse which should have the strength, the speed and the endurance to carry him, with his suit of steel, and his heavy sword, axe and lance, through those terri-

ble hand-to-hand battles, where the victory was frequently due as much to the superior endurance or manageability of the steed as to the prowess of his rider. In these battles the contesting horsemen frequently came together with such force that their steeds would be thrown upon their haunches, or completely overthrown; hence, the advantage of simple weight in the latter is apparent.

The first record of the use of the horse in agriculture is in the Bayeux tapestry, wrought by the wife of William the Conqueror.

THE DRAFT HORSE OF FRANCE.

There have been various infusions of foreign blood, chiefly that of the thoroughbred, into the draft horse of France, and no stud-book has been kept with this breed as with the thoroughbred, consequently it shows considerable variation, both in form and color, and attempts have been made to divide it into the sub-breeds of Flemish, Percheron, Boulonnaise horses, etc. In America, especially, the name "Percheron" has become firmly fixed to the French draft-horse. This breed, whether it be called Norman, Norman-Percheron, or Percheron, undoubtedly originated in Normandy, and from Normandy and Flanders are yet brought the heaviest specimens of the French draft-horse. La Perche, which lies to the south-east of Normandy, is a small department, its territory being comprised in an ellipse about sixty by seventy-five miles in size. The farmers of this department seem to have turned their attention, early in the present century, to the breeding of horses for the omnibusses of Paris, and for their purpose found in the lighter and more active of the horses of Normandy a suitable basis. With the advent of railroads the demand for omnibus-horses decreased, while that for those adapted to heavy draft improved, as did also the facilities for inter-communication between different provinces, which rendered more common the breeding of the stallions of one district upon the mares of another, a practice which the government has fostered by keeping stallions for public service at various stations



NORMAN HORSE. (OLD LOUIS NAPOLEON.)

Imported in 1851, and owned at his death, in 1871, by E. Dillon & Co., Bloomington, Illinois, Importers and Breeders of Norman Horses.



throughout the country. Taking these facts into consideration, together with the fact that no attempt has been made to preserve by means of a stud-book the pedigrees of any of the animals used, while any draft-horse imported from France, or whose pedigree traces to such imported horses, is eligible to entry in the American stud-books of "Norman" or "Percheron-Norman" horses, it is evident that the present dispute over the proper name for this breed is simply absurd, that both the names now in use should be dropped, and that of "French-draft" substituted, just as we use "English-draft" or "English-cart" in speaking of the powerful draft-horse of England. But, since these horses were known in this country as "Norman" long before the name "Percheron" was heard, it seems doubly absurd to drop the former name in favor of the latter.

The prevailing color of the French draft-horse of to-day is gray, varying into black, white, bay, and occasionally into roan or chestnut. Of 877 stallions whose color is given in the first edition of the *National Register of Norman Horses* 714 are gray, 86 black, 40 bay, 11 brown, 11 white, 10 roan, 4 chestnut, and 1 sorrel.

In disposition the French draft-horse is exceptionally patient, a fact which adds much to his value for agricultural purposes; and though his pedigree has not been preserved with the care which the English have devoted to their improved animals generally, yet his uniformity of color, shape, and general character, show that he may be depended upon to perpetuate his characteristics in a marked degree, a fact established by the great improvement made in the American draft-horse since the first introduction of the Norman.

There is little doubt that the French draft-horse made his first appearance on this continent in Canada, where he was no doubt imported by the French colonists of that country at an early day in its history, as we have no record of the first importation. The Canadian Norman horse, however, although considerably smaller than his French ancestor, became very popular throughout the eastern and northern United States, where his blood entered not

only into the draft-horse of the period, but also into the trotting horse, which to-day owes much of his strength and endurance to this infusion.

The first recorded importation of the French-Normans into the United States was made in 1839, by Mr. Edward Harris, of Moorestown, New Jersey, who brought over in that year a stallion and two mares, and followed this importation with several others in later years. The first importation into the region west of the Alleghanies was made by Dr. Brown, of Circleville, Ohio, and the Fullingtons, of Union county, Ohio. In 1865 Dr. A. G. Vanhoorbeke, of New Boston, Illinois, made the first direct importation into that state; but now Illinois annually imports these horses by the hundred, to supply a constantly increasing demand, for the western farmer has found that he can raise a Norman colt almost or quite as cheaply as a Short Horn steer, while he can sell the colt for twice as much as he can get for the steer. Thus far the surplus production of these horses has been eagerly bought up by the eastern cities, and so well do they satisfy the requirements made upon them there that the demand for them constantly outruns the supply.

The following paragraph, by the editor of the *Norman Register*, aptly and without exaggeration expresses the esteem in which this horse is held:

"Since 1851 the Norman horse has crossed the Alleghanies, the Ohio, the Wabash, the Mississippi, the Missouri, the Rockies; and everywhere he thrives, grows in favor, and maintains his imperishable individuality. From the Atlantic to the Pacific, in every territory, he is, in type, in qualities, in disposition, the same peerless animal. His power, his endurance, his unequalled kindness and tractability have won for him the warmest chamber in the heart of the breeder and the most exalted place in the public favor. Stallion-keepers love him because he is easily managed, a sure foal-getter, and an incomparable improver of common horses. Farmers love him because he is easily reared, cheaply kept, no trouble to break, excellent at the plow, invincible at the wagon, and always marketable at the very best prices. Teamsters

and freight-haulers love him because he never balks, always takes a *load* with him when he goes, and, with half a chance, keeps in good condition. Dealers admire him because he is so gentle in handling, and is a never-failing source of profit. In a word, he is a universal favorite."

THE CLYDESDALES.

In previous pages we have shown that the various draft breeds of Great Britain and France must have had a common origin, or an infusion of common blood, at the time of the Conquest, and that this community of blood must have been, to some extent, perpetuated by importations of the Norman stock into England during the interludes between the subsequent Anglo-French wars. History, however, gives us but little information upon this point until within the past century.

Within a comparatively recent period a breed of heavy draft horses has come into prominence in Scotland, which has been called, from the place of its origin, the Clydesdale. The following account of the origin of this breed is condensed from the introduction to the *Clydesdale Stud Book*, issued in Great Britain in 1879:

"Two theories have been advanced with regard to the origin of the Clydesdale breed of horses: the first being that the breed is the result of a cross between the native Scotch mares and some Flemish stallions imported into Scotland by one of the Dukes of Hamilton more than two centuries ago; the second, that its origin is of a later date, though still due to a cross of the Flemish blood. The first theory seems to be unsupported by the facts, as there are neither records nor local traditions relative to the importation of Flemish stallions referred to; but there is a well authenticated tradition that at some time between 1715 and 1720 one John Peterson, of Lochlyoch, parish of Carmichael, brought from England a black Flemish stallion, which so greatly improved the breed of the neighborhood as to make it noted all over Scotland. It is probable that the horses of this section were of better than the average quality previous to the introduction of

this horse, as it lies on the old drove road between England and Scotland, thus affording unusual facilities for the interchange of the live-stock of the two countries.

"The next noted sire in this breed was Glaucer (335), commonly called "Thomson's Black Horse" from his owner. Glaucer was descended, on the side of the dam at least, from the Lochlyoch stock. He was foaled in 1810, and for many years stood in the valley of the Clyde, between Lanark and Glasgow, leaving a strong impression on all Clydesdale stock.

"At about this time the Highland and Agricultural Society (then the Highland Society) had begun to take an interest in this breed of horses, and did much towards establishing the uniformity of color which now characterizes it, by ruling that all animals entered for competition at their shows should be either black bays or brown bays, thus checking the reproduction of other colors, especially grays, which had previously been very common. From this time forth the Clydesdales were carefully bred, until to-day they hold a deservedly high rank as improvers of common horses, standing next to the Normans, as judged by the number imported, in the estimation of the American people.

"In color the Clydes are mostly bay, varying occasionally to black, brown, sorrel or gray; they nearly all have white faces and white feet, and frequently have white spots about the belly. In size they average somewhat larger than the Normans, and they are usually longer in the body and in the hind-quarters than the Normans. An abundance of long hair on the legs is considered a good point in a well-bred Clydesdale."

CLEVELAND BAYS.

Three breeds of draft horses have been extensively cultivated in England: the Cleveland Bay, the Suffolk Punch, and the Shire, or cart horse. Of these the Cleveland Bay was first noticed in Yorkshire, where, in the latter part of the last century, the vicinity of Cleveland became noted for producing a heavy horse suitable for coach or cavalry purposes. These horses



CLYDESDALE HORSE. (ISLESMAN.)

Property of Powell Brothers, Springboro, Pa., Owners and Importers of Draft
Trotting and Coach Horses.



originated in a cross between the thoroughbred and the large native horses of the country, and as first bred were very large and strong, and were properly rated as light-draft horses, the heavy coaches and bad roads of those days rendering it necessary to use horses of a great deal of power as roadsters. But as modern methods of travel superseded the old-fashioned coach, and the roads of the country were improved, a demand arose for a lighter and finer horse than the old Cleveland Bay, which demand was met by a further infusion of the blood of the race-horse, and as now bred these horses are simply large carriage horses, weighing about 1,200 pounds, uniform in style and color, good travelers, and well worthy of cultivating as family or light business horses.

THE SUFFOLK PUNCH.

This horse is thus described in the *National Live Stock Journal* by the Hon. Samuel Dysart:

“The Suffolk Punch is the draft-horse of the midland counties, and derives its name from the county of Suffolk, where history first finds it, and the square, compact form of their bodies. Their breeders are now proposing to call them the ‘agricultural horse,’ but undoubtedly their original name will follow them. Their origin is unknown. Some breeders claim them to be descended from the ancient Norman race; but, like all the horses of western Europe, the reliable part of their history is very brief. It is evident that, for many years, they have been bred with uniformity, and the object has been to produce fine action, combined with size and strength. The breed is better defined than that of any other English draft horses. Their uniformity in size and color—nearly all being of a chestnut-sorrel, with silver mane and tail—proves this fact. Their average weight is about 1,500 pounds. Their bodies throughout indicate great strength and easy keep, being handsomely molded together. Their limbs are of moderate length, muscular and bony, and are free from long hairs on the lower portions. The feet are medium in size, with horny hoofs. In walking they have a long and quick step, and a

swinging trot that saves the muscles of the shoulders. They have an excellent reputation for being true when put to the test in drawing a heavy load; never refusing to exert their utmost power again and again at the word of their driver. Every person is likely to have a preference according to his own ideas, and I am free to say that, from my own stand-point, I believe that for the uses in our country as a draft-horse the Suffolk Punch is preferable to all others seen by me."

THE ENGLISH CART OR SHIRE HORSE.

The description of this horse we also quote from Mr. Dysart:

"Modern history finds in England the same large race of black horses that were known at an earlier date as existing on the continent, along the coast of the North Sea. It is reasonable to suppose that they were taken to England by the invasions of war. Their improvement dates to the last century, by importing stallions from Holland. Afterwards, the importations of mares followed from the same place, and crossed oppositely. From that time there has been a continual improvement by selection and breeding for large and powerful draft-horses, known as cart horses, and which are fairly established as a distinct breed, but they can not with justice be said to be free from late crosses. Being the production of the North of England, we have every reason to believe that, even at the present time, there is some mixture between them and the Scotch Clydesdale, if we would judge by the breeds themselves. Be that as it may, the English cart horses are real giants of their species. From them come the famous brewers' horses of London, which average a full ton in weight. They have every appearance of being Herculean in strength, and, for an animal so large, they have a form that is attractive in symmetry, and may be thus described in representative beasts:

"The head is rather short for the size of the animal, but heavy in appearance; face broad, and oval on lower part; mouth large, and lips thick; eyes small, with placid expression; ears broad,

thick, and short; neck arched, heavy at throat, and thickening almost in line to shoulder points; shoulder moderately slanting, but the withers extending well back; the trunk of the body is very round, and the loin bones reach forward so as to make the coupling short; the rump bones are wide apart, but not prominent, the rump drooping to the tail; buttocks thick and round, which makes the quarter look short; the upper limbs are of proportioned size, and well shaped; the lower part rather heavy but bony, with long hair on the after-part; feet very large, and quite flat on the bottom. That these horses have great strength, there can be no doubt; but nature never intended them to trot or run, and their walking pace is very slow. Their mission is at the heavy dray, drawing great loads, where time is of no value. They never will give satisfaction to Young America."

With regard to the similarity between the English cart horse and the Scotch Clydesdale, Mr. Dysart further says:

"The Scotch appear to have only one favorite large horse for draft, and that is the Clydesdale—so named from the river Clyde, as along the valley of that stream they were first brought to public notice. There can be little doubt that they are of similar origin to the English cart horse. * * * The English breeders told me that the Scotch breeders of the Clydes had come over and bought mares of the cart-horse breed to improve the Clydes; while the Scotchman claims the opposite to be the case. They manifest strong feeling in this matter; and I am not prepared to say either is correct, but if I were to judge by comparing the two breeds of horses there are many points of similarity between them that would give good ground for believing both stories; yet it is plain that there has been a different object pursued in the breeding of these horses. The English breeders seem to have aimed solely at size and strength, without action; while the more far-seeing Scotchman had in view size and strength, combined with quick motion, which they have succeeded quite well in obtaining in their horses. The result has given them a superiority which renders them desirable for many purposes, and therefore more valuable in the general markets than the English horse."

THE MORGAN HORSE.

Among the strains which have been most popular with American breeders, should be included that known as the Morgan; which originated in a self-colored bay horse, about 14 hands high, and weighing about 950 pounds, that was foaled in Massachusetts in 1793, and taken to Vermont (when a colt) by Justin Morgan. This horse was got by "True Briton," who was probably a thoroughbred, but this point is uncertain. Justin Morgan died soon after the purchase of the colt, which was thereafter called by his name. He was a quick-stepping, sure-footed, hardy horse, very showy, and was very popular as a saddle-horse among the commanding officers at the general musters of those days. He died in 1821, at Chelsea, Vermont. Among the most famous of his sons were Sherman Morgan, Bulrush Morgan, and Woodbury Morgan, while Vermont Black Hawk was undoubtedly the most famous of his grandsons.

Had this horse fallen into the hands of such intelligent breeders as those who founded the Short-horn cattle and Leicester sheep, he would undoubtedly have become the progenitor of a strongly marked and most valuable breed. As it is, his descendants are found scattered far and wide over the country, still bearing the marks of color, form, endurance and disposition which characterized him, although but little intelligent care has been bestowed upon their breeding, but few pedigrees being kept, and these tracing generally only through the line of the sires.



ENGLISH DRAFT HORSE. (KING OF THE VALLEY.)

Property of Powell Brothers, Springboro, Pa., Owners and Importers of Draft,
Trouting and Coach Horses.

PART II.

BREEDING AND GENERAL MANAGEMENT.

THE PRINCIPLES OF BREEDING.

The science of stock-breeding is practically in its infancy, yet it has already grown into such proportions that its thorough discussion is impossible here. The most that can be done is to outline a few of the most clearly established facts and most widely accepted theories, with the hope that they will lead the reader to further investigation. Certainly there are few subjects to which the stock-growing farmer can devote his attention with more hope of profit than this; for, upon the proper interpretation of the laws which control the transmission of qualities, has depended the success of those breeders of our domestic animals who have made their names famous by their improvements upon the common stock of the country. It is very true that many of these breeders have been guided rather by intuition than by any knowledge of formulated laws; but as we look back upon their work, and compare the results obtained by different methods, we are enabled to see clearly many truths at which they only guessed, and may thus work in the light of certainty where they groped in the darkness of conjecture.

The foundation of all successful breeding is based upon the principle of *heredity*, a principle whose influence will scarcely be denied by any one who has ever paid any attention to the subject, although there is yet a considerable diversity of opinion as to the amount of this influence. As knowledge progresses in collateral directions, however, men are becoming more and more convinced of the greatness of this influence, and this is especially the case with those who have longest studied its effects in the breeding of

domestic animals, as is evidenced by the value placed upon *pedigree* by a constantly widening circle of the most intelligent breeders. That this influence has been overrated, causing many inferior animals to be used in breeding, on the strength of the good qualities of their ancestors, is no argument against its value; on the contrary, these examples only confirm the law of heredity, in accordance with which inferior qualities are just as surely propagated as superior ones.

To comprehend this principle more fully, let us suppose that we have two animals, a male and a female, of original creation, and therefore free from all ancestral taint, but endowed with every principle which we see manifested in animal life to-day, including this power of transmitting peculiarities of disposition, as well as of form, to their offspring. In the first generation of these offspring we should expect to find a very strong resemblance in most respects to the parent animals; but no law of nature is more plainly written than that of change. Were all the millions of the earth's population gathered together we should each of us be able to separate from the throng the friends whom we have intimately known, and so with these suppositious animals; individual points of the parental organisms would become intensified in each of their offspring, one in one, another in another, according to the greater or less influence of external surroundings. Let us mate these offspring of the second generation, the males with the females, and note the result: The third generation, while still showing great resemblance to the original pair, will still show great differences in this resemblance; for instance, if a pair be mated possessing the greatest number of the peculiarities of the original pair, we may expect their progeny to resemble that pair very closely, more closely, possibly, than any of its immediate descendants; while, on the other hand, the mating of a pair having the fewest of these peculiarities may produce descendants whose characteristics shall be still further from the normal type. But even in these descendants of least resemblance we shall find, lying dormant, those peculiarities which went to make up the total organism, spiritual as well as physical, of the original

pair; and, as time progresses, and external conditions change, we shall find these dormant faculties being awakened, and reappearing in future generations—a phenomenon to which the name of *atarism* has been given. Sometimes the reawakening of these dormant faculties will be caused by the reuniting of two strains of the family, which may have been separated for generations, as has been so frequently shown by the unexpected development of the trotting quality in descendants of the race-horse, Messenger.

This is an epitome of the doctrine of heredity, as it is now understood. Our knowledge of this influence is not yet sufficient to enable us to control with certainty the results of our breeding; indeed, it is evident that an influence of such subtlety, and of such intricate relations, must be extremely difficult to control, even if fully comprehended; but it does enable us to predict, to a very considerable extent, what will be the result of certain lines of breeding.

It will be seen that, to realize the full benefit of this influence, we must be acquainted not only with the peculiarities of the particular animals which we are mating, but also with those of their parents and grand-parents for an indefinite number of generations; thus Agassiz says:

“No offspring is simply the offspring of its father and mother. It is at the same time the offspring of the grandfather and grandmother on both sides; in fact, this dependence of offspring, or liability to reproduce family characteristics, extends much further up the ancestral line.”

Hence the value of herd-books and stud-books, and of the fullest possible descriptions of all remarkable breeding animals.

In-breeding, or the mating of animals that are near of kin, is the method which breeders have adopted for perpetuating and intensifying the peculiarities of certain individuals; by this method undoubtedly the most valuable features of several of our breeds of animals have been developed and fixed; it will readily be seen, however, that this method is one easily abused, since it is just as liable to perpetuate and intensify the undesirable as the desirable qualities, a fact of which breeders have repeatedly

had evidence, in the reappearance, frequently in aggravated forms, of diseases and faults of temper.

Cross-breeding is the mating of unrelated or distantly related strains, and has for its primary object the counteraction of the weakening of constitution which may have resulted from inbreeding, by the infusion of new strains of blood untainted with the defects which may have become too strongly intensified in those previously used. A second office of cross-breeding is the bringing together of similar tendencies originating in widely separated strains of blood, as illustrated in the union of the pacing and trotting families of horses, a union which has given us some of our fleetest animals. A third object of cross-breeding is the improvement of inferior strains of animals by the infusion of superior blood, such as the breeding of the thoroughbred stallion upon the common mares of the country, or the Short-horn bull upon the common cows, methods which have resulted in a vast improvement, for practical uses, of the general stock.

Prepotency is a term used to express the increased power of transmitting valuable qualities which is developed by a philosophical system of breeding. Thus it is almost universally acknowledged that a Short-horn bull or a thoroughbred horse will be far more likely to impress his valuable features upon his progeny than would a grade bull or horse, although the latter might appear to the eye to be even the better animal. This increased power is simply an intensified heredity, and may manifest itself in the ability to transmit speed, as in Messenger and Pilot, or in form and aptitude to fatten, as with certain families of the Short-horns, or in milk or butter qualities, as with branches of the Ayrshire or Jersey breeds.

This increased power of transmission has been well exemplified in cases where the attempt has been made to improve a long established breed by the sudden infusion of new blood; in such cases, where the breed which it was desired to improve had been closely bred within itself until its peculiar characteristics had become strongly fixed, and a strong prepotency of its own thus established, it has been found difficult to overcome these charac-

teristics by an immediate cross from a widely different breed; but if the heredity of the breed to be improved were first broken by mingling its blood with that of others closely related, then the foreign cross could be made with good prospect of success.

This quality of prepotency is not confined to breeds alone, but is frequently met in individuals of all breeds. Among horses one of the best illustrations is the history of Messenger and his progeny, already given. Sometimes this quality is found in the sire, sometimes in the dam; in other words, the progeny will sometimes more closely resemble the one or the other of their parents, a fact observed throughout all animal life.

The *first impregnation* of the female has been proved to have a very important effect in modifying the fruit of her subsequent impregnations. A celebrated illustration of this phenomenon is that given by Lord Morton of a nearly purely-bred chestnut-colored Arabian mare that bore a hybrid to a quagga; she was subsequently bred to a black Arabian horse, and produced two colts; these were partially dun-colored, and were striped on the legs more plainly than the real hybrid, or even than the quagga. Mr. Darwin, in commenting upon this instance, says: "Stripes on the body, not to mention those on the legs, are extremely rare—I speak after having long attended to the subject—with horses of all kinds in Europe, and are almost unknown in the case of Arabians." The hair of the mane in these colts resembled that of the quagga, being short, stiff and upright.

Mr. Darwin, after quoting the above and numerous similar instances of the evident effects of the first impregnation upon subsequent births, says:

"Some physiologists have attempted to account for these remarkable results from a previous impregnation, by the imagination of the mother having been strongly affected; but it will hereafter be seen that there are very slight grounds for any such belief.* Other physiologists attribute the result to the close

*Referring to a subsequent chapter, in which he says: "It was formerly a common belief, still held by some persons, that the imagination of the mother affects the child in the womb. This view is evidently not applicable to the

attachment and freely intercommunicating blood-vessels between the modified embryo and mother. But the analogy from the action of foreign pollen on the ovarium, seed-coats, and other parts of the mother-plant, strongly supports the belief that with animals the male element acts directly on the female, and not through the crossed embryo. With birds there is no close connection between the embryo and mother; yet a careful observer, Dr. Chapins, states that with pigeons the influence of a first male sometimes makes itself perceived in the succeeding broods; but this statement requires confirmation."

It is also believed by some that this influence is reciprocal, the male not only acting upon the female but being, to some extent, modified by her. If, as Mr. Darwin suggests, the influence which the female certainly receives is transmitted directly from the male element, it would seem possible that under certain conditions the male should be similarly affected. It is, we believe, a common belief among poultrymen that it is disadvantageous to allow purely-bred males to associate indiscriminately with females of other breeds, and the following instances, quoted by Mr. W. Godwin, in the *English Live Stock Journal*, would tend to the support of this view:

"A farmer obtained some of the famous Small White swine of the Earl of Ellesmere. The sows produced pure white stock, just like themselves, till the boar had been put to a neighbor's black sow. The next litter after this their pigs came spotted. A similar thing happened to another farmer, but the colors were reversed. Here the boar was black, and the single sow served by

lower animals, which lay unimpregnated eggs, nor to plants. Dr. William Hunter, in the last century, told my father that during many years every woman in a large London lying-in hospital was asked before her confinement whether anything had specially affected her mind, and the answer was written down; and it so happened that in no one instance could a coincidence be detected between the woman's answer and any abnormal structure; but when she knew the structure, she frequently suggested some fresh cause. The belief in the power of the mother's imagination may, perhaps, have arisen from the children of a second marriage resembling the previous father, as certainly sometimes occurs, in accordance with the facts given in a previous chapter."

him was white. The next time following, the black sows brought spotted pigs.

"For the purpose of getting richer milk for family use, a Short-horn breeder of thoroughbred stock obtained a Jersey cow. This he put to his stock bull, and after that all the calves he got the same season out of Short-horn cows came with brown or creamy-colored noses just like the Jersey, but in every other respect were of the Short-horn type—all right.

"He then gives like instances in poultry, and winds up by that of a chestnut-colored pony stallion. He was put one season to a piebald mare. Shortly after he covered a brown mare, the foal from which had distinct piebald markings on one of its forelegs."

These instances are not sufficient to confirm this theory, which, at first sight, seems highly absurd, and are quoted merely to call attention to the subject, in order that more light may be thrown upon it by future observation.

For a more complete discussion of the questions related to breeding, the reader is referred to the excellent work of Dr. Manly Miles upon this subject.*

CHOICE OF SIRE.

From the foregoing it will be seen that the first coupling of a valuable young mare is a matter of considerable importance, aside from the effect upon the foal then begotten. In selecting a horse, therefore, care should be taken that his ancestry be good, and that neither himself nor his progenitors, so far as may be learned, shall have proved faulty in the same directions as the mare; better breed to a somewhat inferior horse, in general make-up and character, than to one whose defects are of the same nature as those of the mare. On the other hand, violent crosses should be avoided, if it be desired to produce a breeding animal, as all experience shows that the products of such crosses, though probably of good appearance themselves, are very liable to prove failures as

*Stock Breeding, by Manly Miles, M. D.; D. Appleton & Co., Publishers.

breeders. The most notable instance of this is the mating of the horse and the ass, which produces an infertile hybrid; while the mating of extremes of less degree of separation, though often yielding a product of decided value in itself, as that of the Cotswold buck upon Merino ewes, or vice versa, yet fails to produce an animal that will satisfactorily reproduce itself.

Hence we should breed constantly toward purity of blood. If we have a large, roomy mare, she can probably be bred to advantage to one of the large draft breeds, selecting the breed and the horse whose characteristics most fully counterbalance the weak points of the mare; and when the foal thus produced is old enough to breed, if it be mare, breed it to the same strain of pure-bred horses, never under any circumstances using a grade horse as a sire.

CONTROLLING THE SEX.

Many theories have been advanced with regard to the causes which determine sex, but we of the enlightened To-day are as much at a loss as were those who theorized in earliest times. Among these various theories it has been supposed:

1. That one side (right or left) of the reproductive organs produces males only, and the other side females. This has been disproved by thorough experiments in which animals deprived of one side or the other have been bred together, and yet produced both sexes.

2. Prof. Thury, of the Academy of Geneva, proposed the theory that sex is dependent upon the degree of maturity of the egg at the time impregnation takes place; and, therefore, that impregnation in the earlier stages of heat will produce females, and in the later stages males, and many examples have been adduced in support of this theory; but if all the failures of controlling sex by this method were carefully enumerated they would undoubtedly outnumber the successes, for the natural method among all wild animals, and largely among domestic animals, is to allow the male and female to run freely together, in which

case impregnation must generally occur at the commencement of heat; yet males and females are produced in nearly equal numbers.

3. A third theory is that the relative age and vigor of the two parents has much to do in determining the sex of the offspring; that is, that if the father be older and stronger than the mother the children will be chiefly males, while if the opposite conditions hold they will be females. Many instances have been brought forward to support this theory also. The report of the census commissioners of Ireland for 1841, as quoted by Dr. Miles,* shows that

“When the parents are of equal age, of 509,913 children there are 105 males to 100 females.

“When the father is older than the mother, of 419,052 children there are 106 males to 100 females.

“When the mother is older than the father, of 48,481 children there are 104 males to 100 females.”

The relative vigor of the parents is not considered in this calculation, as would obviously be impossible. In general it is found that the males exceed the females at birth in the human family, and frequently also among the lower animals.

Heredity seems to have some influence, in conjunction with other causes, in determining sex, but this influence is not yet sufficiently understood to be practically available.

These and many other theories have been advanced, and in many cases remarkable illustrations have been adduced, but the best informed physiologists of the present time are least sanguine with regard to the solution of the mystery.

TREATMENT OF MARE IN FOAL.

After being served by the horse the mare should have a period of comparative rest, as conception will then be more likely to take place than if she should immediately be put to some exercise. From this time forth until near foaling time she will be the

*Stock Breeding, page 306.

better for a reasonable amount of work, but all hard driving or very heavy pulling should be avoided, as being liable to produce abortion. She should also be carefully guarded against being kicked, or crowded in narrow doorways, etc. Her food should be of liberal quantity and good quality, in order to afford ample material for the growth of the foal, and at the same time for laying up a store of surplus flesh to be drawn upon while nursing the colt, but at the same time excessive fatness should be avoided, as this is likely to induce difficulty of parturition, as well as to interfere with the best growth of the foal.

In connection with the subject of working the mare while in foal the following statements by a gentleman writing over the initials S. T. H., are interesting:

"The writer's experience in working brood mares while in foal has been exceedingly valuable. Three road mares, all of which could trot faster than 2:40, were driven on the road within three months of their time of foaling, and, in every instance, they produced colts not only gifted with remarkable trotting action, but with great ambition to trot in the field after they became a few weeks old. The same mares, since they have been devoted exclusively to breeding, have not dropped foals equally gifted or desirous to trot, either in the field or when broken to harness. The first great colt trotter—the celebrated Cora, who was sired by Neave's Clay, instead of Strader's Clay, as published by 'Hark Comstock'—was the daughter of the celebrated roan mare Queen, that, both before and after proving with foal, was used as a road mare. Cora, like a bright school-girl, was talented from birth. After her dam was used exclusively for breeding, and never driven, she had five foals, yet none of them could trot in three minutes. Mark the history of the breeding of the gem of the Fearnought family! Galatea, with a record of 2:25½ as a four-year-old, was out of Grand Duchess, who was trotted continuously in the races through the Grand Circuit at Buffalo, Utica, Springfield, and at Taunton, winning her record of 2:26½ after she had borne the weight of the future Galatea five months in her womb. Harry W. Genet, and many other historical trotters, will trace the secret

of their speed to the same cause. It stands the test of reason. If the trotting brain and trotting muscles and trotting action are constantly stimulated while the mare is carrying the foal, the same formation and development and ambition must be impressed upon the growing foetus.

"The most interesting proof of this position has recently come to the writer's knowledge. One of his friends, in Boone county, Ky., owns a mare that was sired by Alexander's Abdallah, out of a daughter of Norman. She was not only trotting bred, but had exclusively pure trotting action. She was stunted to Bidwell's Almont, a very fast trotting horse, by Wither's Almont, out of a mare by Alexander's Edwin Forrest; so that both sire and dam were trotting bred, with trotting action exclusively. After being bred, she was used as a saddle-mare, and by the manipulation of spurs, and long curb-bits, and weighting her hind feet, she was made to go the running walk and canter, and pace and rack indifferently well. In due time her colt was foaled, when, to the amazement of its owner, it went all the saddle gaits naturally in the field, just as though its ancestors for generations had been bred to the saddle. While to some extent I believe in the vision theory of leading the mare before the stallion after copulation to secure an impress of color and form upon the foetus, to a more decided extent do I believe in the colt receiving its action and ambition from the dam, if her action and ambition are stimulated during the period of gestation by judicious driving. Trot the mare during pregnancy, and the colt will inevitably trot."

PERIOD OF GESTATION.

There is considerable variation in the period of gestation in mares, the extremes being given by Miles at 287 days for the shortest, and 419 days for the longest. Youatt gives the average period as eleven months, or 330 days. Armsby and Jenkins give the average as 340 days, the extremes quoted by them being 307 and 412 days.* Their estimate is the same as that given in

*Farmers' Annual Handbook for 1882.

Mentzel & Von Lengerke's Landwirthschaftlicher Kalender—the organ of the German Experiment Stations.

SIGNS OF FOALING.

The first sign of the near approach of foaling is the filling up of the bag; one or two days before delivery a sort of sticky substance, resembling drops of milk, may be found protruding from the teats. After the appearance of these signs especial care should be taken that the mare have abundant room, and that there be no cracks in which the colt may be caught if she should foal in the night. If the weather be warm the mare is better off in a pasture lot where there are no other horses, nor any hogs or cattle. In cooler weather she should have a roomy box-stall not less than ten or twelve feet square.

ASSISTANCE IN FOALING.

As a general thing it is better to let nature take its course in the parturition of all domestic animals, but there are occasional cases of wrong presentation in which a little knowledge judiciously used may be of great benefit.

The normal presentation of the foal is that of the two fore feet, with the head between, or of the two hind feet, thus forming a wedge-shaped mass which is generally easily expelled. Sometimes, however, one of the feet or the head is turned backward, thus forming a square shoulder which strikes the walls of the pelvis and prevents the exit of the foetus. The water-bags which precede the foetus simply serve to distend the opening, and lubricate it with the fluid they contain; if, after they have served their purpose, the birth fails to take place, an examination should be made, first thoroughly greasing the hand and arm with lard or oil, and inserting it carefully. If but one foot is found, then noose it with a light rope or string, push the foetus gently back, get hold of the other foot and straighten it out; do this between the pains; then, if other things are right, the birth will soon be completed. Sometimes the mare may be so exhausted by long-

continued pains that it will be advisable to assist her expulsive efforts by gently pulling upon the foetus, but this must be carefully done. If the head be thrown back, follow the same methods, first noosing the feet. If the presentation be of the hind feet, which may be ascertained by finding the tail, and by the absence of the nose and mouth-parts, the recovery of a lost limb will be somewhat more difficult, but may still be accomplished, with care and patience. Occasionally both hind legs may fail to appear, making a buttock presentation, when it is sometimes necessary to cut the hamstrings, or to cut off the legs entirely. When the presentation is more difficult than the dropping of a single member, however, a professional veterinarian should be summoned, if possible.

CARE OF THE FOAL.

For a few weeks after foaling the mare should have a period of complete rest, being turned upon grass and fed very moderately with grain, to induce a full flow of milk. It would probably be better if no work were required of her during the time the colt is sucking, but as this is not always practicable great care should be exercised never to allow the mare to become overheated. The overheating of the dam is a frequent cause of death to the colt, and if, by any accident, it occurs, she should be allowed to cool off gradually before the colt is permitted to suck. The colt should be encouraged to learn to eat grain as soon as possible, and to this end the manger in which the mare is fed should be low and wide; thus arranged, the foal will soon learn to eat with the dam.

While the colt is running by the side of its dam its education should be commenced by haltering it in the stable at feeding time, and by tying it to the mare when at work. In this way it may be taught to lead, and also to stand when tied, at the same time becoming accustomed to being handled.

WEANING THE COLT.

Colts are usually weaned at the age of five months. The following method for accomplishing this result is recommended

by the *National Live Stock Journal*: "Halter the colt in a stall adjoining the dam, with a partition so open that they are in plain view of each other. Reduce the food of the mare to a very small ration of dry oats and hay. When her udder becomes so full as to cause her uneasiness, draw off a part of the milk, but be careful not to milk her clean. This first milking should be done by the colt itself, but afterward it should be done by hand, as the milk in the drying-off process soon becomes unfit for the colt, and, besides, the drying-off will thus be more speedily accomplished than when the colt is permitted to suck occasionally. After the milk has entirely dried up, the mare and her foal may be separated, and she may be safely turned out to grass.

"In the meantime great care must be taken with the food of the colt. If it has been properly treated it has already learned to eat heartily, and the food should be of such a character as to supply the place of the milk of the dam. If the foal is young, or in thin flesh, it may be easily taught to drink cow's milk, and nothing can be found that will so completely supply the place of the milk from its own dam, of which it is now deprived. Indeed, it will be well in all cases where, from lack of quantity or quality in the milk of the dam, or from lack of good pasture, the foal is in low flesh, to early supply the deficiency with a good allowance of cow's milk, in addition to what it gets from the dam. New milk should be used at first, until the foal is accustomed to drinking it, but very soon skimmed milk, which will answer very nearly as well, may be substituted. The effect which such a ration will have upon the growth and condition of the foal is wonderful. A quart of milk morning and evening will be quite sufficient, and if it be sweetened a little at first, the colt will take to it all the more readily, as the milk of the dam is much sweeter than cow's milk.

"Oats, ground or unground, constitute the very best grain food for a colt. We prefer to have them ground, and, as cold weather approaches, about one fourth in weight of corn meal may profitably be added, as it helps to lay on fat and keeps up the animal

heat. A little oil-cake meal, say a pint a day, may also be profitably given with the oats for some time after weaning. Don't be afraid of feeding too liberally. More colts are injured the first six months after weaning by too scanty a supply of food, than from any other cause.

"As soon as the mare and foal can be separated, the foal should have, if possible, the run of a good pasture, as there is no food better than grass, no medicine so good as exercise, and no exercise so profitable to young animals as when taken just when they feel like it. A good, warm shelter should be always accessible, so that they may be protected from storms. The idea that 'roughing it' the first winter makes a colt more 'hardy,' is all nonsense. The true theory is plenty of food, abundant exercise, and protection from storms and extreme cold, in well ventilated, well lighted stables."

RAISING COLTS BY HAND.

It sometimes becomes necessary, through the death or ill-health of the mare, to raise the colt by artificial methods. This should only be attempted as a last resort, as it is very difficult of accomplishment, the young colt being much more sensitive to changes in its diet than a calf or lamb, while the great difference in the quality of the milk of the mare and the cow renders the change to the latter, especially for a very young colt, a difficult one to bear.

When, however, the only alternative is to attempt to raise the colt by hand or to let it die, the conditions of its natural food-supply should be imitated as closely as possible. This food-supply, we observe, is offered frequently, but in small quantities; the milk of the mare shows, on analysis, a larger per cent. of sugar, and a smaller of fat and casein, than that of the cow, hence cow's milk should be slightly diluted with water, and somewhat sweetened, before giving to the colt. It should, of course, be given warm, and in small quantities at frequent intervals, until the colt becomes accustomed to the change, when the intervals may be lengthened and the quantity increased. The most common error

in the feeding of colts, as of all young animals, is giving too much. This induces diarrhœa, which, when started, is difficult to check.

A little oil-cake meal may be added to the ration to advantage, beginning with a very small quantity, and gradually increasing to a tablespoonful, the meal to be made into a thin gruel with boiling water and then added to the milk. This meal, judiciously fed, will diminish the tendency to diarrhœa, although an excess is to be guarded against. The colt should be induced to eat oats and shelled corn when two or three months old—the whole grain is less liable to scour than oatmeal or corn meal—and grass or good hay should be furnished as soon as it will eat it.

AFTER WEANING,

Or after the withdrawal of milk in the case of the hand-raised colt, the food should be such as to maintain a healthy and vigorous growth. It is a great mistake to stint the growing colt, while, at the same time, grain should not be given in such excess as to overload the digestive organs. Oil-cake meal is one of the best of foods for young animals, if judiciously used; corn is objectionable, on account of its tendency to fatten, but it is much better to feed corn than to give no grain. Exercise is very necessary; without it all the good effects of liberal feeding will be lost, as the digestion will either become impaired, or the colt will become excessively fat, and its growth in bone and muscle thereby retarded.

Handling should be continued in every practicable manner. The sooner the colt learns the use of the harness, and the fact that man is his master, the more valuable he will be when he reaches a serviceable age. No labor should be required, however, until the growth is nearly attained, and no severe labor until after the fourth year, as during the third and fourth years the milk or colt teeth are being replaced by the permanent set, a process which frequently affects the vigor of the animal; so frequently during the fourth year, especially, that it is a common

opinion among farmers that a three-year-old colt will perform more labor than a four-year-old.

Shelter is essential to economical growth. The colt which is exposed to the inclemency of the winter, getting its living only around the straw stack, will neither be so large nor so hardy as one which has been judiciously sheltered, while it will have consumed a great deal of food that has simply been *burned* in the body for the production of animal heat to resist the cold blasts, which might far more cheaply have been shut off by proper shelter.

EARLY BREEDING.

Fillies which it is desired should grow into valuable animals should never be bred until their fourth year, thus giving opportunity for their growth to be well completed before subjecting them to the exhausting drain of reproduction. The same is true of young horses; they should not be used while still colts for stud purposes, as the progeny of such immature animals cannot possess the strength and hardihood of those which have come to maturity.

On the other hand, breeding from horses of extreme age is less likely to give satisfactory results than if they be in their prime. Yet there are exceptions to both these rules: for instance, Rysdyk's Hambletonian was only two years old when he got Alexander's Abdallah, and he in turn was only four years old when he got Goldsmith Maid; while Lexington's dam was fourteen or older when he was dropped, and the dam of American Eclipse was twelve, he being her first foal.

These, however, as well as others which might be enumerated, must be regarded as exceptional instances, since overwhelming evidence may be drawn from all departments of animal life that, as a rule, the most vigorous offspring come from fully developed parents who are yet in the prime of life. The cases noted, therefore, only prove that the parents themselves were exceptionally vigorous for animals of their ages.

TRAINING.

As previously urged, the education of the colt should begin while it is still running by its dam. If the lesson is then thoroughly inculcated that man is both friend and master, the horse will never forget it. This early handling should not include any form of labor, as the colt's bones do not become sufficiently hardened to perform any laborious service, without injury, until it is nearly grown. The old style of training, or "breaking," as it was then properly called, was to let the colt run entirely free from restraint until three or four years old. It was then taken up, harnessed, and put to work, the process involving a struggle for freedom on the part of the colt which often rendered the operation of breaking a dangerous one. If managed as here urged the only difficulty in the operation will be the overcoming of a little awkwardness of the colt in its unfamiliar duties.

The essential qualifications for a successful colt-trainer are unlimited patience, indomitable perseverance, and ceaseless watchfulness. The man who possesses these qualifications will not fly into a passion and abuse his colt for his awkwardness, and will even overcome stubbornness by continued patience, repeating to-day the lesson of yesterday, and so on until it is thoroughly learned, while he will see that the colt is never for an instant left in such a position that he may get the advantage of his driver, when impelled by sudden fright or restlessness. To accomplish this every part of the harness must be secure, and the lines must always be in the driver's hands, when the colt is not otherwise securely tied.

In training a colt it should always, if possible, be first worked by the side of a steady old horse, until it learns the meaning of the harness, and begins to comprehend the duties expected of it; and these duties should always be within the limits of accomplishment without extreme exertion, both to avoid injury to the unhardened shoulders and growing bones, and also to prevent the

discouragement and consequent formation of the vicious habit of balking, due to over-loading.

No word of command should ever be given to colt or old horse unless in position to compel obedience. By adherence to this rule the horse may be trained to stop at the word under all conditions, and accidents often prevented thereby. The colt should, from the start, be accustomed to the flapping of the tugs about its hind legs, and to other unexpected touches, in order to diminish the danger from extraordinary emergencies, such as the parting of the hold-backs when going down hill. He should also be accustomed to all unfamiliar objects at which he shows signs of fear, by giving him time and opportunity to examine them thoroughly.

By patience, firmness, and carefulness, the most wayward colt may be converted into a faithful servant; but in the absence of either of these qualifications in the master, the servant may become a treacherous enemy.*

STABLES AND STABLE MANAGEMENT.

Light and Ventilation.—The two commonest defects in our horse-stables are insufficiency of light and improper ventilation. More often than otherwise the only arrangements for the admission of light are the small holes at the rear of the stable through which the manure is thrown, the cracks between the loose siding, and the doorways, which, when open, admit light enough, it is true, but when closed in stormy weather leave the stable so dark that the sudden change caused by leading the horse into the bright sunlight of the open air produces a severe shock upon the optic nerve, frequently resulting in blindness or impaired vision. Nature's provision in this case is plain enough, and we should profit by it: the change from daylight to darkness through the twilight or dawn is an almost imperceptible one, and therefore our horse-stables, as well as our own living rooms, should be so arranged that there shall be the least possible strain upon the eyes in walking from them into the free sunlight.

Probably the best point from which the stable can be lighted is the rear, thus avoiding the glare of direct light. As, however, it is seldom practicable to admit a sufficient quantity of light from this quarter, provision should be made for side lights, and these should be placed as high as possible, in order that the light may fall upon the eyes in the most natural manner possible. This matter of light is no trivial one; blindness is one of the most frequent affections of the horse, and we have had abundant evidence, in our own experience, that this is often caused chiefly if not wholly by dark stables.

Lack of ventilation is not a common fault in the American stable. On the contrary there is generally enough and to spare, but it is often so arranged as not only to fail of its proper function, but to aggravate the evils which it ought to correct. Thus in a large majority of stables the only provision made for the entrance of fresh air is through the cracks of the siding, and through open manure-holes, doors, and windows. This arrangement allows the air to sweep through in draughts, chilling the animals and inducing disease. To avoid chilling draughts, and at the same time provide the steady current of air which is essential to the removal of the exhalations given off by the animals, is a problem which is sometimes difficult of solution. If, however, the stable be so arranged that the horses shall stand with their heads toward a feed-room or passage-way—and this is by far the most convenient arrangement—the fresh air may be admitted at the ends of this passage-way, and an upward current established through the hay-shute, which should extend from the feed-room upward to the top of the building, which again should be ventilated either by slatted windows in the gables, or by cupolas in the roof. In a building so constructed, if there be any motion of the air on the outside it will produce a current through the ventilating windows, which will, in turn, induce an upward current from the lower floor; and this, passing in front of the horses' noses, instead of across their backs and sides, will give them a constant supply of fresh air without any injurious draught.

For the sake both of convenience and healthfulness a straw-shute should be placed in the rear of the horses, the mows overhead being planned accordingly, and this will assist in removing the ammoniacal vapors which are constantly rising from the dung. These shutes, thus serving as ventilator tubes, will not only assist in providing fresh air for the animals, but they will carry off the animal exhalations which would otherwise lodge in the hay overhead.

The Stable Floor.—Next to light and ventilation the stable floor claims our attention, as largely affecting both the health of the horse and the convenience of his keeper. Undoubtedly the best stable floor, so far as the health of the horse is concerned, is one of earth, provided it be kept in proper condition. But, as every practical horseman knows, this is a very difficult thing to do. The pawing of a restless horse soon works a hole under his fore feet, while his excrements keep the part under his hind-quarters in a bad condition, if not also worked into holes; consequently the earthen floor is discarded in our best stables. On account of the cheapness of lumber and its apparent cleanliness that material has been generally used as a substitute, but it is open to several objections. The plank floor, as usually made, is too dry for the best condition of the horse's feet, which naturally require a small degree of moisture. If it be not made water tight, and it generally is not, it causes the liquid excrement to be wasted, thus entailing a loss of a very valuable part of the manure, as well as saturating the earth below the stable floor and producing unwholesome exhalations. The plank floor also affords a harbor for vermin beneath it, and an entrance way for cold draughts of air; while its short endurance renders it a very expensive floor.

In England concrete has long been used for stable floors, but it is objectionable on account of lack of durability, being soon broken by the pawing of restive horses.

The most satisfactory stable floors we have ever seen were those made of paving brick, set on edge. Such a floor, carefully laid, of good material, will last indefinitely, and, at the relative prices of the two materials, is frequently cheaper than plank at the

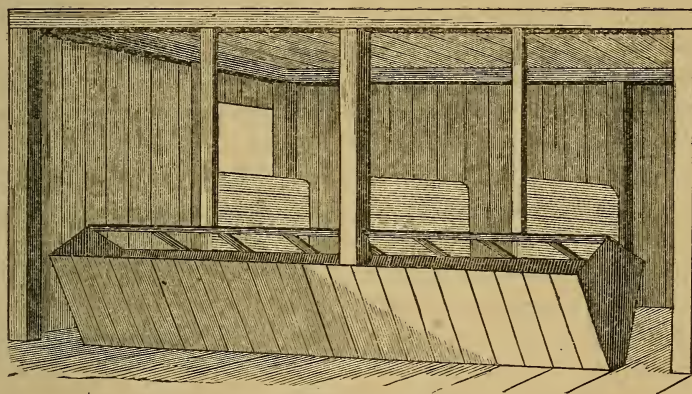
outset, and always cheaper when its superior durability is considered. In laying the brick floor especial care should be taken that the foundation be thoroughly settled, as otherwise the floor will settle unevenly, producing holes. Vermin should also be carefully excluded by cutting a narrow trench around the outer edge to the depth of two feet or more, partly filling this with a grout mixed with hydraulic cement, and in this bedding the stones which form the curbing. The floor should be laid with a shallow channel at the rear to carry off the liquid manure, and it will be better for the fore feet if the forward part slope downward slightly toward the manger, thus giving the horse a chance to stand with his toes pointing slightly downward, a position which many horses seem glad to assume.

Whatever kind of floor be used, bedding of straw, sawdust, leaves, etc., should be furnished in abundance, both for the sake of cleanliness and to soften the floor to the feet. If the liquid manure be not carried to a cistern, an additional amount of bedding should be supplied as an absorbent, as this ingredient of the manure is far too valuable to be lost.

The Manger.—The cut on the opposite page shows a form of manger, the description of which, and enumeration of its advantages, will serve to show some of the errors to be guarded against in the construction of mangers in general:

This manger is three feet four inches high next the horse, three feet nine inches under the centre rail, and three feet two inches next the feed-room; it is two feet four inches wide from the centre rail to the side next the horse, and one foot eight inches from centre rail to feed-room. The alternate partitions are cut away at the top rail, as shown, the only separation below this point being the feed-boxes (not shown in cut), each of which is twelve inches wide by ten inches deep, and long enough to reach across the manger at the top, the ends being cut to fit the slope of the sides of the manger. These boxes are made of 2x12 plank, and are placed on the right-hand or "off" side of each stall. A false bottom is placed in this manger, leaving it about eighteen inches deep next the feed-room

by two feet next the horse; the object of this being to reduce the size of the manger, and thus prevent careless hands from over-feeding with hay, and at the same time to give the horse a shallow, broad manger, in which he can pick over his feed at leisure. Experience has shown that in such a manger he will eat up his food cleaner than in a narrow, deep one, in which the lower layers become soiled with saliva and packed down so tight that, especially if they contain thistles or other weeds, the horse cannot well turn them over. In this manger corn-fodder may be fed at full length, a bundle being divided between two horses,



AN IMPROVED MANGER.

while the refuse stalks may be readily cleaned out from the front side, thus preventing the littering of the stable with them. The feed-boxes, being placed between the stalls and under the top rail, will prevent the horses getting their noses together and quarreling. If hay only is fed the partition may extend to the bottom of the manger. The slats on the side next the horse prevent his pulling his feed out on that side, while the top rail and the width of the manger prevent his throwing it out in the feed-room, especially as this width gives him full opportunity to pick it over. The feed being entirely below there is no littering of hay-seed into the eyes and mane, as when the manger is in the

form of a rack or shute, while it enables the horse to stand while feeding in his natural position, and not with his nose thrown up, like a giraffe, nor with his neck arched, as by the check-rein and martingale, as with the very high mangers frequently used. The manger being entirely open on the side next the feed-room allows the easy introduction of hay, and also facilitates cleaning out, as stated. In the case of a narrow feed-room this part of the manger may be hinged, so as to shut in even with the top rail; and if the stable floor be a foot below the feed-room floor, the latter may be used as the bottom of the manger.

The Stalls.—A horse-stall should never be less than five feet in the clear in width, and five and a half feet is better. The partitions between two stalls should be boarded up on both sides for four feet, above which single boarding for three feet more will be sufficient for most horses. The lower four feet should extend back about seven feet from the edge of the manger, to prevent the horses from kicking each other. The height of the stable should not be less than eight feet for small horses, and nine for large ones. This is a very important point, as one of the commonest causes of poll-evil is the striking of the head against the beams of the upper floor. Especial care should be taken that the stall partitions reach the floor, otherwise the horse is liable to get his legs fast and broken.

The Feed-Room and Water Supply.—In general the feeding-room is too much contracted; often consisting of nothing more than a narrow passage way, four to six feet wide. It will pay well to allow space in this room for meal-bins, cutting box, mixing troughs, etc., and, if the drainage can be so arranged as to carry off all the soakage of the stables and manure heaps, the well should also be located here. To combine convenience with safety and profit the stable floors should be water-tight, and arranged to conduct the liquid manure to the rear of the building, where it should be received in cisterns, or taken up by abundant absorbents; the drainage of the manure-yard should be from the rear of the stable, and the feed-room and well should be in front of it. If the well be replaced by a good cistern it will add much to the

safety of the water, as it is almost impossible to prevent the contamination of a well located in a barn. While it may be difficult to trace any disease of horses to such contamination, it has been well established that cows may convey to those who use their milk the germs of disease gathered at their drinking places.

Feeding.—The proper feeding of a horse is an operation requiring the exercise of a greater amount of common sense than can be expected of any ordinary hired groom. The treatment best adapted to the needs of the severely worked draft-horse is very different from that required by the carriage-horse which is only occasionally put in harness; while the same horse requires different treatment, according to the amount of service demanded of him.

For the maintenance of perfect health the working horse requires that a portion of his food shall be of the character called "rough-feed," and the remainder of a more nutritious kind, and the proper balance between these two kinds of food is one which is at times difficult to maintain.

Thus the driving horse, if he is liable to be called upon for rapid traveling, should receive but little hay through the day, his main supply being given at his evening feed, and then as small a quantity as may be found consistent with health—a quantity which can only be established by careful experiment, since no two horses will require precisely the same. This method of feeding is necessary in order that his stomach and bowels may be loaded as lightly as possible when his work is needed. The draft horse, however, whose work is less violent than that of the roadster, may have his hay-allowance more evenly distributed throughout the day. Horses that are not subjected to severe labor may be kept chiefly on hay, but the consumption of a sufficient quantity to meet the ordinary demands of existence produces a distension of the stomach and abdomen, together with a flabbiness of muscle, which renders the animal unfit for much exertion. This condition is greatly exaggerated if the hay be replaced by food of a less nutritive quality, as damaged hay or straw, in which case the ratio which should exist between the nitrogenous and

carbonaceous elements of the food is disturbed, the latter being greatly in excess. In order that such feeding should be economical grain should be very high, straw very cheap, and the labor or growth of the animal a matter of no consequence.

On the other hand, the mistake is frequently made of giving too much grain, with the result of developing a tendency to fatten, or of disturbing the proper ratio of the food in the opposite direction from that of straw-feeding—in which case much of the grain will fail of digestion, and therefore produce no effect.

The secret of successful feeding lies in giving such a ration, both in quantity and quality, as shall maintain the animal in a healthy, vigorous condition, without causing it to fatten; and this secret can only be attained by personal practice and observation, changing the food from day to day as circumstances seem to require, until the desired mean in quantity and quality is reached, as shown by the stationary condition of the horse. It is evident that the quantity will still have to be changed from season to season to suit the changes of temperature.

No one point in feeding is of more importance than regularity. The animal, of whatever kind, that is fed at irregular hours, or allowed to miss a meal whenever it happens to be a little inconvenient to attend to it, will show its neglect in seriously impaired usefulness. Such management is both improvident and cruel.

Grooming.—The object of grooming or currying is not simply the removal of mud or other external dirt, to give the horse a better appearance, but the cleansing of the skin by the removal of the scurf and dust which is constantly accumulating beneath the hair, and thus clogging the pores of the skin and impairing its function. The brush, therefore, should visit every part of the body daily, and be vigorously applied. The neglect of careful cleansing of the legs especially is one of the causes of scratches or grease heel.

DRIVING.

There are a few points of special importance in the management of driving horses, which are also applicable in a less

degree to those used for draft. The morning feed should be given early, that digestion may be as far progressed as possible before the day's work is begun; the first hour's work should be done at a moderate gait, giving the horse the opportunity to finish digesting his morning meal, and to unload his bowels of the accumulations of the night before; the horse should not be hurried over hills, because a rapid gait up the hill exhausts his "wind," and thus draws upon the stores of energy needed for future service; while the jar of going down hill rapidly is liable to injure his front feet and shoulders. When the roads are level, however, he may be kept at a steady jog, and this is better than to "blow" him by a quick spurt and then allow him to go slowly to regain his breath. It is the steady-going horse who makes the longest trip and comes in freshest at night.

In driving the reins should be held sufficiently tight to produce a constant, steady, but gentle pressure on the bit. Thus held the horse will soon become so accustomed to the hand of the driver that the smallest pressure upon either rein, given by the fingers or by a slight twist of the wrist, will turn him to either side as desired, while his speed will be regulated in the same manner. At the same time the horse should be accustomed to the voice of his master, and especially should be trained to stop at the word, a training which may often prevent serious accidents, in case of unexpected disarrangement of the harness.

A horse driven with a firm rein will travel faster and farther, and with greater ease to himself and his driver, than if the reins are allowed to hang at his sides, while many an accident has been caused by the horse suddenly starting or shying, and getting the advantage of his driver before the latter could gather up his loosely-held reins.

HORSEBACK RIDING.

The art of riding is one which must be learned by practice, and few rules can be given which will be of much service. The following hints, however, may assist the learner in his first efforts:

The bridle for riding should be as light as possible, compatible

with strength; there should be but a single rein, and, if martingales are used, they should be adjusted to such a length as to press upon the reins only when the head is thrown very high. For quiet horses the martingale is only a nuisance, but for very spirited animals it is sometimes serviceable, and for those disposed to rear it is an absolute necessity. The bit should be of the variety known as curb, made light but strong. A snaffle is not fit for a riding bit, in any case. The horse may go somewhat awkwardly at first under a curb, but he will soon become accustomed to it, if it is properly handled, and can thereafter be controlled far more easily and gracefully.

The manner in which the reins are held is a very important matter. As in driving, so also in riding, there should be a constant pressure upon the bit—the horse ridden with dangling reins will be an unusually good one if he does not stumble, while if he has any spirit he will be liable to unseat his rider by a sudden start—nevertheless the pressure upon the rein should be of the gentlest character, the hand acting simply as a perfect spring, exerting the lightest possible pressure, and accommodating itself to the motion of the animal, but ready at any time to seize the reins with a firm grip and thus remind him that he is under control of a master-spirit.

For pleasure-riding the saddle should have a low, flat seat; but when riding becomes a business the high Mexican or army saddle will be found the most comfortable. In either case the stirrup should be of sufficient length to allow the full extension of the leg, without requiring it to be stretched to reach it.

It is needless to say that the position of the rider should be constantly erect; the reins should be held in the left hand, and both hands should be held in a low and easy position.

The gaits of the riding-horse should be the canter, and some form of the pacing or racking gaits. It is difficult to ride either a square trotter or pacer with either ease or grace, but trotters that possess some admixture of pacing blood may sometimes be trained to a very pleasant riding gait. Frequently the tendency to pace or rack is not manifested until the horse is five or six

years of age, and is then shown under the saddle; but when a horse begins to show a tendency to change his gait he may be easily trained to use only his easiest gait when ridden. This training is accomplished by riding with curb bit and martingales, holding a tight rein, especially when it is desired to start from the walk into a faster gait, urging the horse forward with whip or spur, but checking him immediately, and requiring him to start again, when he takes the wrong gait. When going down hill a horse will naturally take such a gait as will produce the least jar to himself, and this fact may be taken advantage of in training him to travel for the rider's ease.

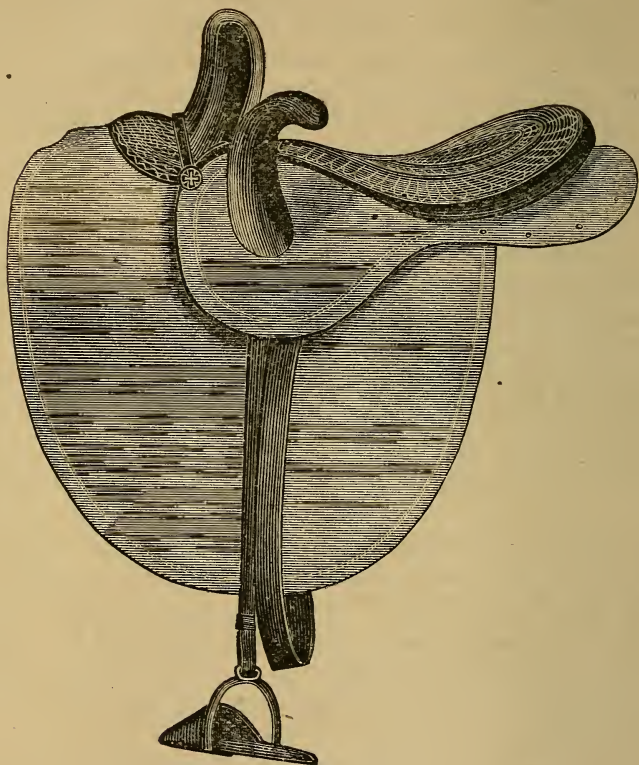
HORSEBACK RIDING FOR LADIES.

To ride a good horse is one of the most exhilarating of pastimes, as well as one of the most healthful of exercises, and there can be no doubt that our wives and daughters would complain far less of ill-health if carriages and railways were abolished, and their only means of locomotion were on foot or horseback. As this cannot be, the next best thing would be to make horseback riding fashionable, and thus popularize a recreation to which the rosy cheeks of our grandmothers were largely due. Happily there seems now to be a tendency in this direction, and the sight of a lady on horseback is less uncommon than it was a few years ago.

With regard to the bridle and its management the remarks previously made apply equally well to the lady's outfit for riding. The proper tension of the reins is one which ladies should especially study, as the danger from a slack rein is for them especially great.

The riding-habit is so much under the control of the whims of fashion that it seems hopeless to say anything here in regard to it. The dictates of common sense, as well as those of good taste, would make it simply long enough to cover the feet securely. The extremely long habits which serve as such convenient receptacles for the splatters of the road, are both disgusting to the escort and dangerous to the wearer. For ladies who may

have the energy to take long rides over mountainous roads, the picturesque riding costume of the Sandwich Island ladies, described by Miss Bird,* and worn by her in her hundreds of miles of horseback riding over those islands and over the Rocky Mountains, is certainly the most sensible garment, as it permits riding



SIDE-SADDLE.

astride. For ordinary riding, however, this position is not necessary to a reasonable amount of security, since the hunting saddle, shown in the illustration on this page, affords, in its hunting or

*"Six Months in the Sandwich Islands," and "A Lady's Life in the Rocky Mountains," by Miss Bird,—two of the most delightful of books of travel.

leaping horn, the means by which the left knee may be held down, and thus the seat kept secure. It will readily be seen, by reference to the figure, that the man's saddle itself scarcely affords a more secure seat than is given by this form of side-saddle, provided the girths remain intact. The following paragraph, referring to this saddle, is quoted from Herbert's "Hints to Horsekeepers," and was written by a lady:

"The prejudice of many American ladies, especially in the country, against the third horn of the saddle, is purely the result of habit. Having always been accustomed to the old style of saddle, they experience a restraint in the first use of the leaping horn, which suggests a dangerous confinement of the limbs, and they seem to fear that they could not easily disengage themselves from it, in case of accident. This fear is groundless; they could, in no case, get off on the right side, and, in dismounting to the left, the leg is simply lowered away from it, so that it can, in no sense, be considered an obstacle to jumping off from the horse. The mere fact that it prevents the worst of all accidents—being thrown onto the left horn in case of the horse falling—is an unanswerable argument in its favor, and no lady who has been accustomed to its use would be willing to dispense with it."

The girth is a very important part of a saddle of either kind; but it is especially necessary to the security of the side-saddle seat, and should therefore be frequently examined to see that it shows no sign of unsoundness, and the lady should be sure that it has been properly tightened before mounting her horse. In this connection it should be remembered that a girth which was properly tight in the morning may be quite loose before night, owing both to the stretching of the material and to the contraction of the abdomen of the horse through removal of its contents.

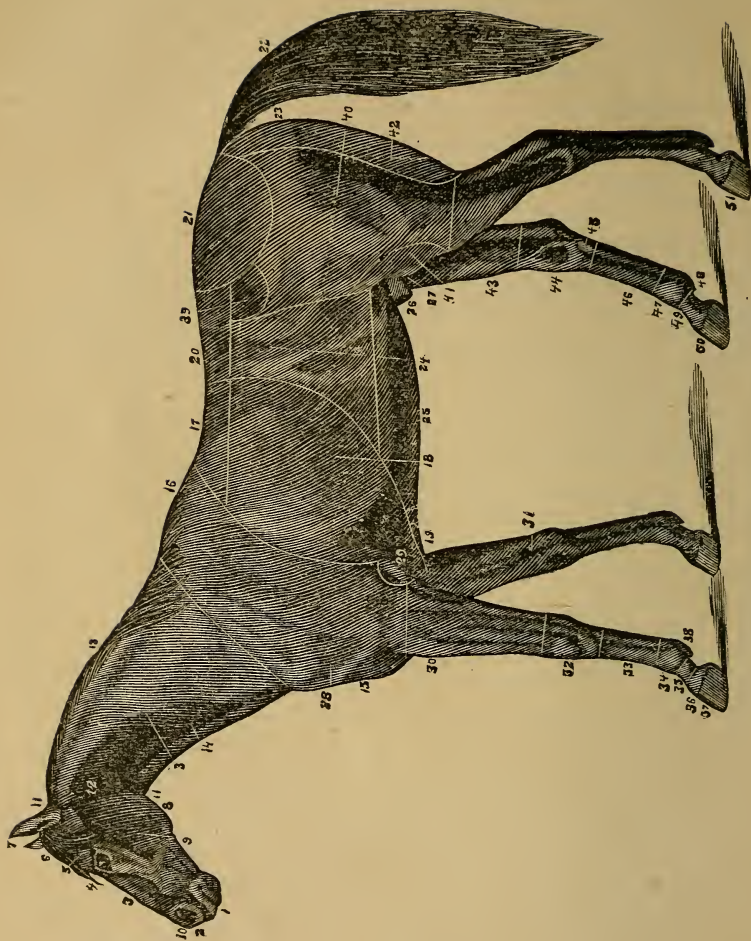
The stirrup should either be furnished with a guard to prevent the foot becoming fast in it, or should be made so small that only the toes can enter. More serious accidents have probably resulted from the rider being thrown and dragged by a foot fastened in the stirrup than from all other causes incident to ladies riding,

and no lady should ever trust herself in a saddle if its stirrup can by any possibility entangle her foot. Safety stirrups are now made in such manner that the side will open as soon as the foot is lifted from the bottom, thus preventing all danger of accident. Such a stirrup is represented in the illustration here shown.



SAFETY STIRRUP.

This stirrup is made of two separate pieces, hinged together as shown in the cut. While the foot is in the stirrup its pressure upon the bottom piece *c* holds the part *a*, *c*, in place, as shown by the dotted lines; but when the pressure is removed this part opens, allowing the foot to pass out at the side.



EXTERNAL REGIONS OF THE HORSE.

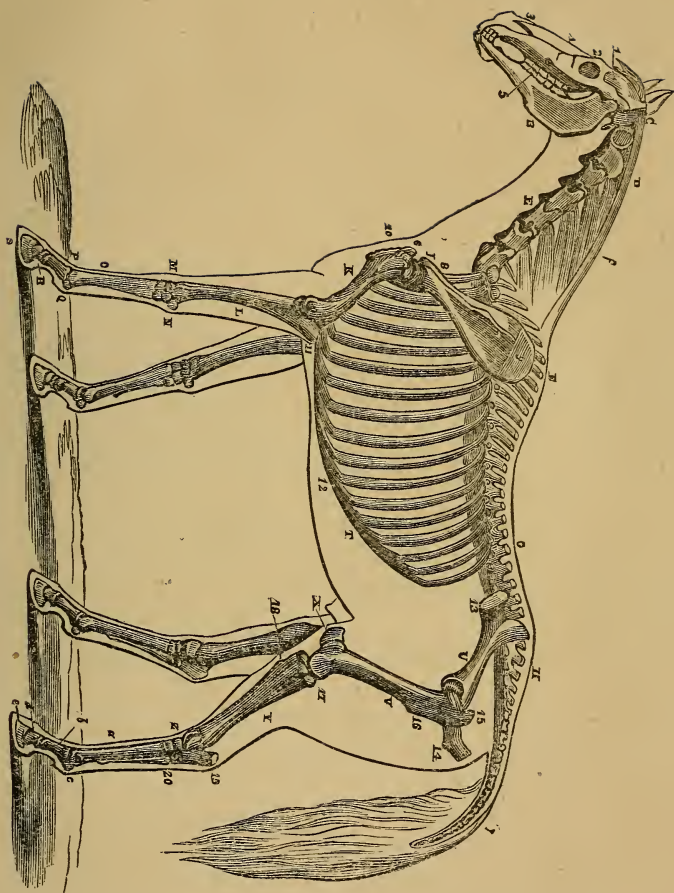
EXTERNAL REGIONS OF THE HORSE.

- | | |
|----------------------|------------------------|
| 1. Lips. | 25. Belly. |
| 2. Nose. | 26. Sheath. |
| 3. Face. | 27. Testicles. |
| 4. Forehead. | 28. Shoulders and Arm. |
| 5. Eyebrows. | 29. Elbow. |
| 6. Forelock. | 30. Fore-arm. |
| 7. Ears. | 32. Knee. |
| 8. Lower Jaw. | 33. Cannon, or Shank. |
| 9. Cheeks. | 34. Fetlock. |
| 10. Nostril. | 35. Pastern. |
| 11. Poll. | 36. Coronet. |
| 11. α Throat. | 37. Foot. |
| 12. Parotid. | 38. Ergot and Fetlock. |
| 13. Neck. | 39. Haunch. |
| 13. α Mane. | 40. Thigh. |
| 14. Jugular. | 41. Stifle. |
| 15. Breast. | 42. Buttocks. |
| 16. Withers. | 43. Leg. |
| 17. Back. | 44. Hock. |
| 18. Ribs. | 46. Cannon, or Shank. |
| 19. Girth. | 47. Fetlock Joint. |
| 20. Loins. | 48. Ergot and Fetlock. |
| 21. Croup. | 49. Pastern. |
| 22. Tail. | 50. Coronet. |
| 23. Anour, or Dock. | 51. Foot. |
| 24. Flanks. | |

SKELETON OF THE HORSE.

- | | |
|--|---|
| <p>A. Head.</p> <p>B. Lower Jaw.</p> <p>C. Atlas, or first vertebra of Neck.</p> <p>D. Axis, or second vertebra of Neck.</p> <p>E. The remaining five cervical vertebrae.</p> <p>F. Spinous process of back withers.</p> <p>G. Dorsal and Lumbar vertebrae.</p> <p>H. Sacrum; base of croup.</p> <p>I. Coccygeal, or tail bones.</p> <p>J. Scapula, or shoulder blade.</p> <p>K. Humerus, or arm-bone.</p> <p>L. Radius, or bone of fore-arm.</p> <p>M. Carpal, or knee bones.</p> <p>N. Trapezium, or bend of knee bone.</p> <p>O. Metacarpal, or cannon bone.</p> <p>P. First Phalanx, or pastern bone.</p> <p>Q. Large sesamoid bone.</p> <p>R. Second phalanx, or coronet bone.</p> <p>S. Third phalanx, or foot bone.</p> <p>T. Ribs.</p> <p>U. Coccyx, or croup bone.</p> <p>V. Femur, or thigh bone.</p> <p>X. Patella.</p> <p>Y. Tibia, or leg bone.</p> <p>Z. Hock, or tarsal bones.</p> <p>a. Cannon, or metatarsal bones.</p> <p>b. First phalanx, or pastern bone.</p> <p>c. Large sesamoid.</p> <p>d. Second phalanx, or coronet bone.</p> <p>e. Third phalanx, or foot bone.</p> <p>f. Superior band of cervical ligament.</p> | <p>1. Zygomatic arch.</p> <p>2. Orbital cavity.</p> <p>3. Nasal, or face bones.</p> <p>4. Incisor teeth.</p> <p>5. Molar teeth.</p> <p>6. Scapulo-humeral, or shoulder arm joint.</p> <p>7. Acromion process, or spine of the shoulder blade.</p> <p>8. Hollow of the shoulder blade.</p> <p>9. Cartilage of shoulder blade.</p> <p>10. Superior tuberosity of the humerus.</p> <p>11. Olecranon, or elbow bone.</p> <p>12. Cartilage of the ribs.</p> <p>13. Haunch, external and internal angle of ilium.</p> <p>14. Sacrum, posterior angle of the ilium.</p> <p>15. Great trochanter.</p> <p>16. Small trochanter.</p> <p>17. Articulation between femur and tibia.</p> <p>18. Superior tuberosity of tibia.</p> <p>19. Calcaneum.</p> <p>20. Head of the fibula.</p> |
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SKELETON OF THE HORSE.



PART III.

ANATOMY AND PHYSIOLOGY.

As an introduction to the chapter on diseases and their treatment, we here offer a brief discussion of the anatomy and physiology of the horse, confining this discussion to the more salient points of difference between the equine and the human organism, and referring our readers to the works on human anatomy and physiology for general information upon such points as are common to both horse and man.

ANATOMY AND PHYSIOLOGY.

For convenience of classification we may consider the animal body as made up of several systems, each working to a certain extent independently of the rest, but all necessary to the complete organism. These are, (1) the *bony* system, or skeleton, which serves as a frame-work supporting all the other parts; (2) the *muscular* system, which serves as the ropes by which the other parts are moved; (3) the *nervous* system, which, including the brain, controls all other organs; (4) the *digestive* system, by which the nourishment of the body is prepared; (5) the *circulatory* system, which carries this prepared nourishment to its proper destination; (6) the *excretory* system, by which certain deleterious substances are removed from the body; and, (7) the *generative* system, through which the species is propagated. Within these systems are also included the special organs of locomotion and of sensation.

THE SKELETON.

The bony frame-work of the horse is composed of two hundred and forty-seven bones, apportioned as follows:

1. Bones of the skull.....	10
2. Bones of the spinal column and tail, embracing: 7 cervical, 18 dorsal, 6 lumbar and 17 caudal vertebræ.....	48
3. Bones of the face, jaws, etc., embracing: 18 bones in the face and lower jaw; 40 teeth; 4 bones in each ear, and 5 bones at the base of the tongue.....	71
4. Bones of the thorax, embracing: 18 bones on each side and the sternum in the middle.....	37
5. Bones of the pelvis.....	3
6. Bones of locomotion, embracing in front: the scapula, humerus, os brachii, 8 carpal bones, 3 metacarpals, os suffraginis, os coronæ, os pedis, os naviculare, 2 ossa sesamoideæ; total, 20 on each side.....	40
and behind:	
the femur, patella, tibia, fibula, 6 tarsal bones, 3 metatarsals, os suffraginis, os coronæ, os pedis, os naviculare, 2 ossa sesamoideæ; total, 19 on each side.....	38

The nomenclature of the various portions of the skeleton will be comprehended by reference to the accompanying chart.

In constitution and function the various bones of the horse differ in no essential point from those of man, except the teeth, whose peculiarities of construction and growth are fully considered in the section devoted to their connection with the age of the horse. The skull of the horse, like that of man and other animals, is composed of several pieces, joined together by sutures, and forming a chamber which contains the brain; this chamber is prolonged posteriorly by the narrow cavity of the spinal column which contains the spinal cord, while the spinal column itself is composed of numerous portions so joined together as to give a considerable degree of flexibility, combined with far greater strength than would be attained in a single bone.

The bones of the face and lower jaw, the ribs, and pelvic bones, differ chiefly in form from those of man. The most notable difference between the two skeletons in these regions is the absence of the clavicle in the horse.

The bones of locomotion in the horse offer more resemblances to those of man, after careful investigation, than will at first be suspected. Taking the fore limbs the identical function of the shoulder blades will at once be perceived: it is easy to see that the humerus in the horse bears a strong resemblance to that in man. Next comes the radius, with its prolongation forming the elbow; next the carpal bones, occurring in the *knee* of the horse, according to the popular idea, and in the wrist of man; next the metacarpals, corresponding to the five bones of the hand, and which in the horse now number but three, viz: the large metacarpal or cannon bone, and the two small metacarpals or splints; but the researches of Marsh and others into the history of the fossil horse have shown that the earliest forms of the horse probably possessed five metacarpals, with the corresponding toes, and that the one now left corresponds with the larger or middle finger of man. From this point down the relationship between the three bones below the fetlock, the lower one having its horny *hoof*, with the three bones below the knuckle, the last one with its horny *nail*, is easily perceived. In the same manner the resemblances between bones of the hind extremities of the horse and the lower extremities of man may be traced, thus suggesting the query whether Gulliver's experience with the Houyhnhnms was simply the creation of Swift's fertile imagination, or was the working of that law of the transmigratorist, whereby the impressions received in a pre-existent state are sometimes revived in our minds?

THE MUSCLES.

In respect to constitution and general function the muscular system of the horse differs in no important point from that of man. In one as in the other, to attain the highest degree of health and vigor it is necessary that the muscles be abundantly, though not excessively nourished, and that they be regularly and judiciously exercised. The horse confined to his stable and highly fed will develop a soft, flaccid muscle, fit for but little real service; while, on the other hand, excessive labor upon scant

feed will cause a general weakening of the muscular fibres. The proper mean of sufficient exercise, with just enough food, is one difficult to attain, and yet one necessary to the highest degree of serviceability in the animal.

THE NERVOUS SYSTEM.

In organization and function the nervous system of the horse is the same as that of man. Being less highly organized the horse is less liable to diseases of a purely nervous character than man, yet he is not wholly exempt, as will be seen in the following discussion of diseases and their treatment. In some respects the sensory nerves of the horse are more acute than those of man, and in others less so. Thus the sense of touch, which in man is developed chiefly in the fingers, is most highly developed in the horse in the lips and nose; while in the general sensitiveness to pain from wounds, etc., the horse, in common with most dumb animals, seems to suffer much less than man. The hearing of the horse seems to differ but little, in domestication, from that of man, though in the wild state it is doubtless more acute; and the same may be said of the sense of smell. Horses seem less subject to deafness than man, but are not entirely exempt. They evidently have a well-developed sense of taste, and their vision is no doubt in all respects similar to that of man, while it is extremely liable to impairment.

THE DIGESTIVE SYSTEM.

The digestive organs of the horse differ but little in general function from those of man. The teeth are wholly herbivorous in their construction, instead of being herbo-carnivorous as in man. The oesophagus has at its lower extremity a valve, which prevents the return of matter from the stomach to the mouth, so that it is impossible for the horse to vomit. The stomach holds but about three gallons, and is partly divided by a constriction, thus showing a greater resemblance in size and form to the human stomach on the one hand than to the large, compound

one of the ruminants on the other. The intestines of the horse have a total length of a little more than ninety feet, while those of the ox are about one hundred and fifty feet in length, and those of man about twenty-five feet. (The weight of man is about one eighth that of the horse.) In the horse the large intestine is about one third the length of the small; in man, about one fifth that length.

The liver, pancreas, and spleen perform approximately the same functions in the horse as in man, and are not particularly liable to any special diseases.

THE CIRCULATORY SYSTEM.

The circulatory system of the horse is constructed upon the same general principles as that of man. The position of the principal blood-vessels is shown in the illustration on page 91.

THE EXCRETORY SYSTEM.

The chief organs of excretion, viz: the skin, lungs, liver, and kidneys, perform the same functions in the horse as in man, which is the removal from the body of the deleterious substances produced by the wear of its tissues. These substances consist chiefly of carbon, hydrogen and nitrogen; the carbon passing away from the lungs as carbonic acid; from the liver in connection with hydrogen in certain forms of fatty matter; the nitrogen being chiefly eliminated by the kidneys in the form of urea.

Physiologists have established the fact that the prompt removal of these substances is even more essential to the health and life of the mammal than regular supplies of food, since life may be supported for a considerable period with but little food, but the complete suppression of any of the excretory functions will produce death in a very short time. Hence the necessity for thoroughly understanding these functions, and the treatment required to maintain their healthful action. Thus vigorous exercise causes a rapid disintegration of the animal tissues, and a consequent increase of the work to be performed by the excre-

tory organs; if this exercise be carried to excess, stimulating the skin and lungs to their utmost, and largely increasing the heat of the body, and then this heat be suddenly lowered by exposure to cold draughts of air in the street, or in an open stable, congestion of the pores of the skin and membranes of the lungs results, and they are rendered unable to properly perform their functions. High feeding and lack of exercise also cause derangement of the liver and kidneys, by necessitating an abnormal action of these organs in order to remove the accumulation of deleterious matter.

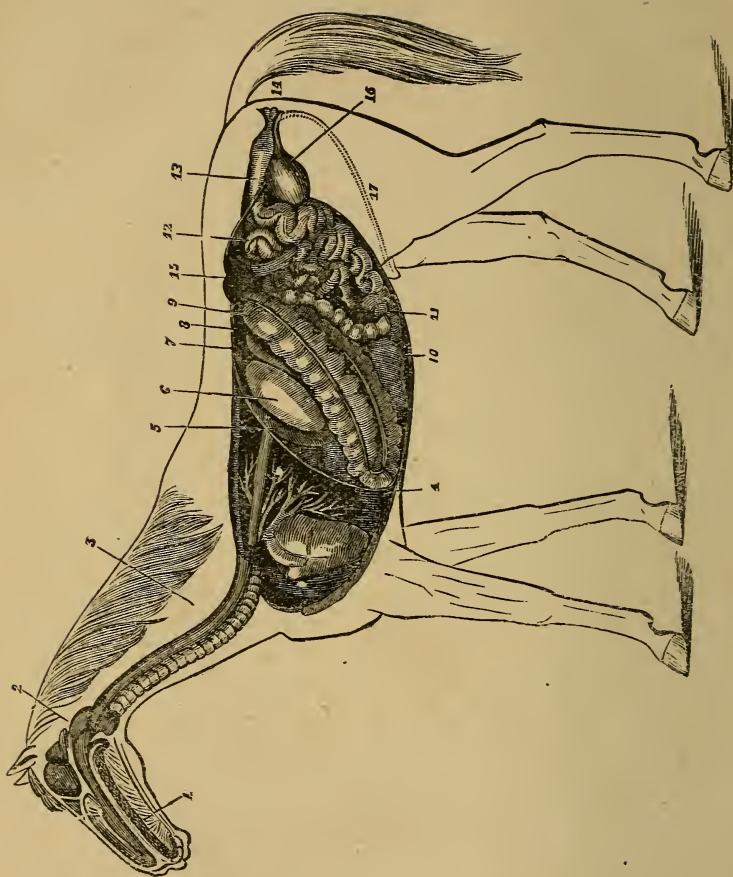
The above brief hints are merely designed to show the necessity for a careful investigation of the nature and functions of the excretory organs. A complete discussion of this question would be foreign to the purpose of this book, since it would add nothing to what already exists in any good treatise on human physiology.

THE GENERATIVE SYSTEM.

The generative organs of the horse are thus described by "Stonehenge":

"The male organs of generation consist of the testes and their ducts, the vasa deferentia, the latter conveying the semen to the urethra, or to the vesiculæ seminales, which are oval bags connected with the upper surfaces of the neck of the bladder. Here the seminal fluid is stored up for use, and when wanted is conveyed into the vagina by means of the external organ or penis. The anatomy of the testicles is that which mainly concerns the horse-master, as they are generally removed by operation. They are contained within the scrotum, which is externally composed of skin, wrinkled in the foal, but subsequently distended by the size and weight of its contents. Beneath this is a layer of a pale-yellowish fibrous membrane called the dartos, which envelops the testes and forms a separation between them. A thin coat of cellular membrane alone separates this from the double serous membrane, the tunica vaginalis, which almost entirely envelops each testis, just as the pleura does the lung. In the early stages of foetal life the testes are contained within

DIGESTIVE APPARATUS OF THE HORSE.



DIGESTIVE APPARATUS OF THE HORSE.

- | | |
|---------------------------|---------------------------------|
| 1. Mouth. | 10. Caecum. |
| 2. Pharynx. | 11. Small intestine. |
| 3. Œsophagus. | 12. Floating colon. |
| 4. Diaphragm. | 13. Rectum. |
| 5. Spleen. | 14. Anus. |
| 6. Stomach (left sec.) | 15. Left kidney and its ureter. |
| 7. Duodenum. | 16. Bladder. |
| 8. Liver—upper extremity. | 17. Urethra. |
| 9. Large colon. | |

CIRCULATORY ORGANS OF THE HORSE.

- | | |
|-------------------------------|--|
| 1. Heart—right ventricle. | 18. Cardiac trunk, distributed to the stomach. |
| 2. Heart—left ventricle. | 19. Mesenteric vessels. |
| 3. Heart—left auricle. | 20. Renal artery. |
| 4. Pulmonary artery. | 21. Spermatic artery. |
| 5. Pulmonary veins. | 22. Posterior vena cava. |
| 6. Anterior aorta. | 23. Venae portæ. |
| 7. Common carotid artery. | 24. External iliae artery. |
| 8. External maxillary artery. | 25. Internal iliae artery. |
| 9. Left axillary artery. | 26. Subsacral artery. |
| 10. Dorsal artery. | 27. Femoral artery. |
| 11. Superior cervical artery. | 28. Posterior tibial artery. |
| 12. Vertebral artery. | 29. Digital artery. |
| 13. Humeral artery. | 30. Veinous network of the foot. |
| 14. Radial artery. | 31. Veins of the leg. |
| 15. Collateral of the cannon. | 33. Jugular vein. |
| 16. Coronary branch. | |
| 17. Posterior aorta. | |

CIRCULATORY ORGANS OF THE HORSE



the abdomen above the peritoneum; but being attached to the scrotum by a thin muscle (the cremaster) they are gradually dragged downwards through the inguinal canals, and each brings a double layer of peritoneum, which continues its connection through life, so that fluid injected into the cavity of the tunica vaginalis will flow into the peritoneal cavity. Hence inguinal hernia in the horse becomes scrotal in a very short space of time, and rarely remains confined to the former position. The testicles with their appendages, the vesiculæ seminales, form the semen by the usual process of secretion. They are of about the size of a duck's egg, and besides their attachment by the reflexions of the tunica vaginalis to the scrotum, they have also the spermatic cord which suspends them to the inguinal canal through which it passes. This cord it is which is divided in castration, and it is well to ascertain its component parts. They are: 1st. The artery which supplies the testicles with blood, and is of considerable size, and tortuous in its course. 2d. The artery of the cord, small and unimportant. 3d. The veins which accompany these arteries. 4th. The nerves and absorbents, the division of the former giving great pain and causing a slight shock to the system. 5th. The vas deferens, or duct carrying the semen to the urethra, and possessing walls of such thickness that it feels like whipcord under the finger. These several parts are connected together by cellular membrane, and covered by the two layers of reflected peritoneum, namely, the tunica vaginalis and tunica vaginalis reflexa; by the thin layer of the cremaster muscle, as well as by a fourth investment, a continuation of the superficial fascia of the abdomen. All these parts must be divided before the canal is reached, for operating in castration.

“The female organs of generation are essentially the ovaries, the uterus and its appendages forming the bed in which the embryo is nurtured to maturity. The ovaries are two small oval bodies, about the size of large walnuts, situated behind the kidneys, and having the fimbriated extremities of the fallopian tubes hanging loosely adjacent to them. These tubes, one on each side, terminate in the uterus, which is of a remarkable shape in the

mare. It consists of a body and two horns. The body has a mouth, or os, which opens into the end of the vagina, while, in itself, it is oblong, and in the unimpregnated state is contained entirely within the pelvis. Anteriorly it divides into two horns (cornua), which diverge toward the loins, turning upwards, and lying under the wings of the ossa ilii. They terminate in rounded extremities. Each cornu receives the fallopian tube of its own side, the opening being so small as scarcely to admit a silver probe. The vagina lies between the bladder and the rectum, and is about eighteen inches in length; it is lined with mucous membrane, and surrounded with muscular fibres, which form the sphincter vaginae."

SPECIAL ORGANS.

The two special organs of the horse which are most liable to disorder are the eye and the foot. The former, standing so prominently out from his head as it does, is especially liable to injury from external sources, while it seems to be at the same time peculiarly susceptible to diseases of a sympathetic nature; while the latter, being the locomotive organ of the animal, and thus subjected to excessive strains and jars in carrying the heavy body over hard roads, is so liable to injury, and yet so necessary to the usefulness of the horse, that the familiar adage "no foot, no horse," is no exaggeration of its importance.

THE EYE.

The most noticeable points of difference between the human eye and that of the horse are (1) the horizontal elongation of the pupil, which seems to be designed for the more ready admission of light from the sides, thus extending the horizontal field of vision; (2) the floating appendages or curtains hanging from the upper side of the pupil, which apparently serve to moderate the direct rays of sunlight; and (3) the third eyelid, or band, technically the *membrana nictitans*, the use of which is to assist in clearing

the eye of an insect or other foreign matter which may get into it.

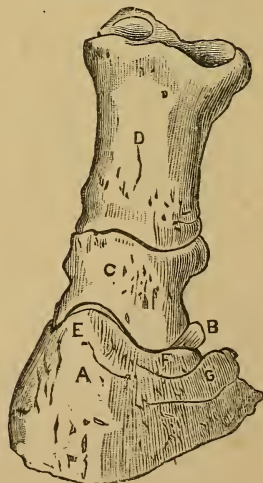
In many forms of disease the eye soon manifests its sympathy with the diseased condition of the body, and then this membrane may be seen partially drawn over the eyeball. This has often been ignorantly supposed to be the *cause*, instead of the *effect* of the disease; the horse has been said to have the "haws," or "hooks," and the membrane has been cut away, much to his injury and discomfort.

Sometimes the brown color of the iris is replaced by white, in which the horse is said to have a wall, or glass eye. This is not considered any blemish, so far as the usefulness of the organ is concerned.

THE FOOT.

The bones of the foot are, (1) the foot-bone proper, or coffin bone, (*os pedis*); (2) the coronary bone, (*os coronæ*); (3) the

- A. *Os pedis*—foot bone.
- B. *Os naviculare*—nut bone.
- C. *Os coronæ*—coronary bone.
- D. *Os suffraginis*—pastern bone,
- E. Point of insertion of coronary tendon.
- F. Concavity to give attachment to the cartilage of the foot.
- G. Groove which receives a division of the blood-vessels coming round from behind.

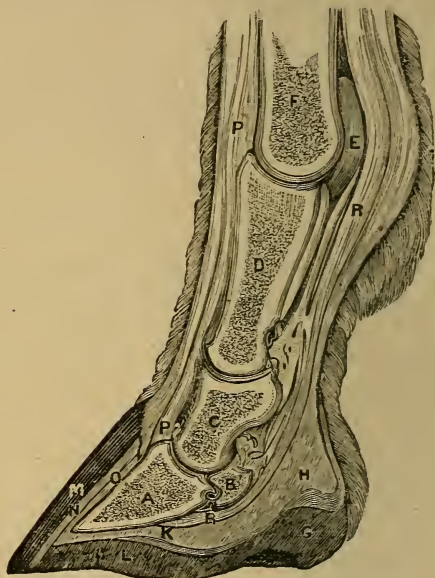


BONES OF THE FOOT.

pastern bone, (*os suffraginis*); (4) the navicular, or nut bone, (*os naviculare*). These are shown in their relative position in the cuts on this and the following page. These bones are furnished with

numerous processes, or points of attachment for the tendons of the muscles by which they are controlled, which tendons extend upward beyond the knee and hock before they swell into muscles. Between the tendons lie the nerves and blood-vessels which supply the lower extremities, and the whole are closely invested with the outer integument, which changes in character at the upper portion of the coffin bone from the skin and hair which

- A. Coffin or foot bone.
- B. Navicular or nut bone.
- C. Coronary or lower pastern bone.
- D. Upper pastern bone.
- E. One of the sesamoid bones.
- F. Cannon or shank bone.
- G. Horny frog.
- H. Sensitive frog.
- K. Sensitive sole.
- L. Horny or insensitive sole.
- M. Outer wall or crust.
- N. Laminated leaves or horny plates.
- O. Sensitive laminae.
- P. P. Tendon of the extensor muscle of the foot and coronary bones.
- R. R. Tendon of the flexor muscle of the coronary and foot bones.

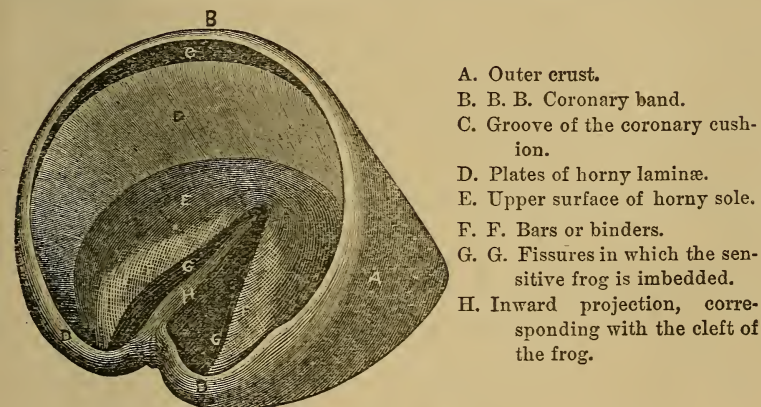


SECTION OF THE FOOT AND PASTERNS.

covers the rest of the body to a firmly built, horny material, called the hoof.

The hoof consists of three parts: (1) the *crust*, which reaches from the edge of the hairy skin to the bottom of the foot, averaging about three inches and a half in depth by half an inch in thickness in front, the thickness diminishing to a quarter of an inch on the sides, and consisting of horny fibres arranged vertically; (2) the *sole*, or horny plate at the bottom of the foot, which should be slightly concave downwards, and is fixed to the inner edge of the crust and the outer edges of the bars, but

not to their lower surfaces; and (3) the *frog*, which is the prominent, triangular and elastic substance which fills the space between the heels posteriorly, the bars on each side, and the sole in front. This frog forms an elastic, horny cushion, lying immediately beneath the navicular bone, and spreading out posteriorly on each side into a thin band which covers the bulbs of the heels and passes around the foot at the junction of the hairy skin and hoof, constituting what is known as the *coronary band*. This coronary band is abundantly supplied with blood-vessels, and in it the growth of the hoof takes place. The coronary substance extends downward between the hoof and the bone, and



THE HOOF.

terminates in thin plates or *laminae*, which are plentifully supplied with blood-vessels, and form a secretory surface which aids the coronary substance in forming the horn. They are continuous at the sole and frog with similar substances, the whole serving both for the growth of the exterior parts, and as an elastic cushion to mitigate the jar caused by the descent of the foot upon the ground, as they are firmly connected with the bone within as well as with the horn without.

It will thus be seen that the pressure of the pedal bone does not come wholly upon the sole of the foot, but is largely supported by the attachment of the laminae to the horny front and

sides. In some forms of disease this attachment becomes weakened, thus allowing a greater pressure upon the sole, and producing the deformity called flat-foot.

The growth of the outer shell of the hoof takes place, as has been said, at the upper margin, called the coronary band; in healthy feet this growth is continuous, causing a lengthening of the hoof similar to that of the finger nails. If the horse be moderately used on gritty roads without shoeing the hoof will be worn away at the bottom as fast as it receives new growth from the top and will remain of a uniform length. If the horse be but little used, and this only on soft ground, it may be necessary to remove the superfluous growth by artificial means; and the same will be the case with horses that are kept constantly shod. In the case of the sole of the foot, however, there is seldom any occasion for removing any portion except to trim off the ragged edges of the horny plates of which this part is composed. One of the most frequent errors in shoeing is to cut deeply into the sole and frog with the buttress, thus weakening the natural support of the coffin bone, and inducing serious lameness. The best horse-shoers now have little or no use for the buttress, leveling the foot and removing its surplus growth of crust wholly with the knife and rasp, and merely trimming the frog and sole.

The shoe should be perfectly level on its lower face, toes and calks being used only when necessitated by icy weather. The face next the foot should be made concave, so that the outer crust only will press upon its edge, since the sole requires space for a certain amount of vertical motion, and will be injured by pressing against the inner edge of the shoe.

Bearing in mind the natural use of the frog it will readily be seen that the horse should be so shod that the frog may receive some pressure; if, however, the shoeing has for some time been done in such a manner as to lift the frog wholly from the ground, the change to a rational method should be made gradually, as the frog loses its elasticity from disuse, and the sudden change is liable to produce lameness.

TELLING THE HORSE'S AGE BY THE TEETH.

Upon this subject we quote from Boericke & Tafel's "Manual of Veterinary Practice," the following account of the dentition of the horse, which is taken from the English work entitled "Horses and Stables," by Colonel F. Fitzwygram. The illustrations are re-engraved from a recent article on this subject, in the Journal of the Royal Agricultural Society, by Prof. G. T. Brown, of the Veterinary Department of the Privy Council, England:

"Structural alterations take place in the teeth every year from birth up to the sixth year; hence there can rarely be any question as to the real age of a horse up to that date, though dealers often try to deceive the unwary by various tricks. Such tricks are, however, easily detected.

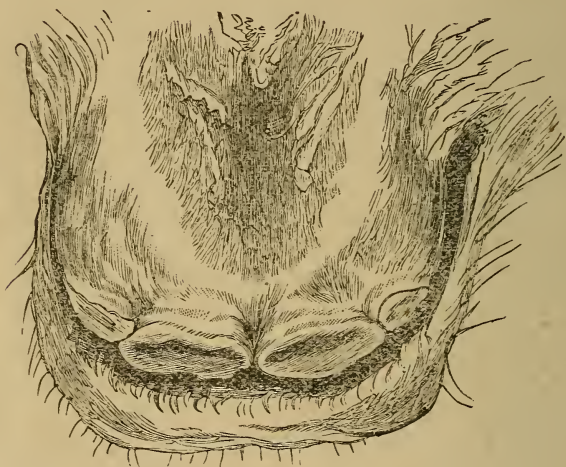
"After the mouth is fully completed, the age can only be approximately determined, by the effect of wear in altering the shape of the teeth, by the receding of the gums, and by other such signs.

"Many circumstances, however, often contribute to modify the effect of wear on the teeth, and also to increase or decrease the action of time in other respects. Hence, after six years old, a correct opinion can only be formed by those who have given to the subject some time, thought, and trouble.

"The foal is born usually with two, sometimes with three, temporary molars in each jaw. About twelve months old another molar, a permanent tooth, appears, and before the completion of the second year a fifth molar, also a permanent tooth, shows itself.

"At about two and a half years the two anterior temporary molars are replaced by permanent teeth, and between three and four the remaining, or third, temporary molar is similarly replaced; and about the same time the last or sixth permanent molar begins to appear. Thus when the mouth is completed, there are six permanent molars in each jaw, or twenty-four in all.

"These structural changes afford a very good index of the age of the horse up to the period when they are completed, namely, four years old. The molars, however, are seldom referred to, because their position at the back of the mouth renders their examination inconvenient, and often very difficult. Nevertheless, it is useful to be acquainted with the structural changes of these teeth, in cases where there may be a doubt as to the true age, as indicated by the incisors. After four years old, the molars are not often taken into consideration in determining the age of the horse.



INCISORS OF COLT AT BIRTH.

"We may mention, in passing, that a supplementary molar, known as a "*wolf-tooth*," sometimes appears in either jaw. Such teeth seldom cause any inconvenience. If they do so, they can easily be removed by the pincers, as they are only of a rudimentary character.

"The anterior teeth, or *incisors*, are six in number in each jaw, when the mouth is complete; and in the immediate rear of these, in males, there is usually added one very peculiar pointed tooth on each side in each jaw, called a tusk. Though there are two

crops of incisors, yet there is but one of tusks. In fact, these teeth, though they begin to appear at about four years old, are not usually fully developed until the last permanent incisor is more or less up.

“For the sake of brevity we shall confine our remarks to the lower jaw, as the structural changes which take place in the upper are nearly similar. In passing, however, we may remark that the upper incisors are considerably longer and larger than the lower.

“*Temporary*, otherwise called *milk* incisors, are easily distin-



TEMPORARY
INCISOR.

guished from permanent incisors by the following well-marked signs, namely: they are smaller, whiter, and have more distinct necks. They are smooth externally, and grooved on the inside, probably in order to enable the foal more easily to grip the teats of the dam. Their fangs are small, and have but little attachment to the gums. The jaws are plump, fleshy, and round, and the teeth are arranged in something like a semi-circle.

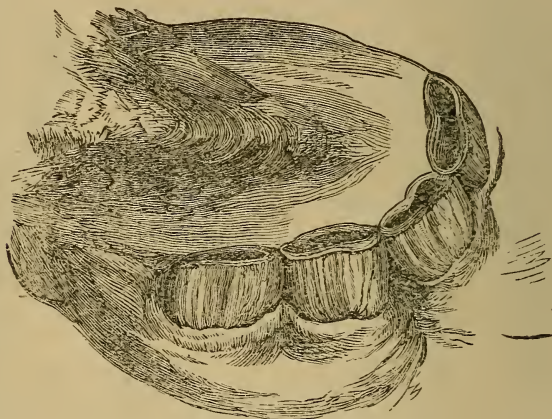


PERMANENT INCISOR.

“*Permanent* incisors, on the other hand, are larger, broader, wider in their necks, grooved externally and smooth internally, and more discolored than milk teeth. The discoloration is due to the lodgement, in the grooves, of the juices and other matters connected with the food. The object of the external grooving is probably to enable the animal to get a better grip on grass and such like food. The plumpness and circularity of the jaw are less marked than in the younger animal, and gradually decrease, until in old age the teeth are arranged in a nearly straight line.

"The FOAL is born with his teeth in a rudimentary state in the gums. At various periods during the first ten months the different temporary incisors appear. Under one year old the foal is also clearly distinguished by a woolly tail.

"The YEARLING's mouth is complete with all six incisors, but several well-marked signs distinguish his mouth from that of the two-year-old. The teeth at this period show but little signs of wear. The corner teeth are mere shells, having no inner walls, and all the teeth are in close juxtaposition.



INCISORS OF COLT AT SIX MONTHS.

"At two years old, the inner wall of the corner teeth has grown up level with the outer wall. The centre teeth show considerable signs of wear, and indeed all the teeth appear somewhat smaller than they did in the yearling. They also stand somewhat wide apart at their necks, on account of the gradual growth of the jaw in width.

"A few months before THREE years old the horse sheds the two centre milk teeth, which are replaced by permanent ones. Thus the jaw contains at three years old two centre permanent teeth and two milk teeth on each side.

"A few months before FOUR the horse sheds the two next milk

teeth, which are replaced by permanent. Thus the jaw now contains four permanent teeth, and one milk tooth on each side."

During the fourth year the horse gets sixteen teeth, viz: four incisors, four tusks, and eight molars. Hence it is not surprising that horses at this age are especially delicate.

"A few months before FIVE the horse sheds the two remaining milk teeth, which are replaced by permanent. Thus the jaw is



INCISORS OF YEARLING COLT.

now furnished with six permanent incisors, but the corner teeth are mere shells, having no internal wall. The absence of this wall distinguishes the five from the six year old mouth.

"A few months before SIX the inner wall of the corner teeth has grown up level with the outer wall.

"The mouth is now fully complete in incisors, and no further structural changes take place in them. As a general rule, we may add that the upper temporary teeth fall out a little before those in the lower jaw.

"Up to six years old, therefore, inasmuch as we have structural changes to guide us, there can seldom be any doubt as to the age of the animal. There are, however, some well-authenticated instances of abnormal development of the permanent incisors, but they are rare.

"Thoroughbred horses date their ages from the first of January, whilst other horses are reckoned from the first of May. Thoroughbred mares are covered so as to throw their foals as soon as possible after the first of January; whilst in regard to other mares the owner does not wish to have their progeny born before the spring grass is available for the sustenance of the dam and her foal.

"High feeding encourages the growth of the teeth in common with the rest of the frame. Hence thoroughbreds (independently of their earlier date of foaling) are somewhat more forward in their mouths than half-bred animals.

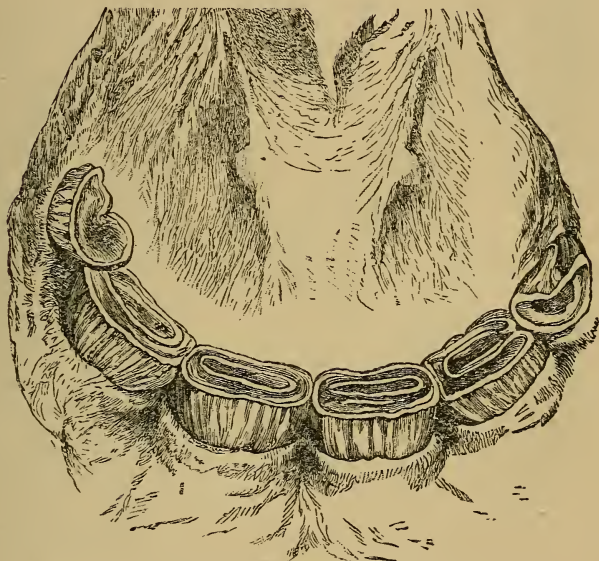
"It is a common practice among dealers to pull out the milk teeth about to fall out next. Nature, however, does not supply the permanent tooth much before its proper time. The absence of a milk tooth, when its place has not been supplied by a permanent tooth, need not mislead any one.

"*The Mark.*—Hitherto we have taken no notice of the mark, or *infundibulum*. We have abstained from doing so, not because the marks in the young mouth do not afford some indication of the age, but because fuller and more satisfactory evidence, up to six years old, is afforded by the structural changes detailed above. After six, however, we are compelled to have recourse to the indications given by the marks, and other slight, but gradual alterations, which take place in the form of the teeth.

"A satisfactory explanation of the mark cannot, we are afraid, be given without entering at some length into the structure and organization of the teeth. The mark is a very peculiar hollow, extending, when the first tooth comes up, about half an inch down the temporary, and rather deeper down the permanent incisors.

"Teeth practically may be said to consist of two materials, viz:

enamel and dentine. Enamel, which is very hard, sharp, and originally of pearly whiteness, covers the outside of the teeth, and also lines the sides and bottom of the hollow or infundibulum. Thus in the tooth, as it originally appears, there are four walls of enamel. The remainder of the tooth consists chiefly of dentine, a substance of considerable, but less hardness than enamel, and more like ivory. A small quantity of *crusta petrosa* (cementum) is also found on the outside.

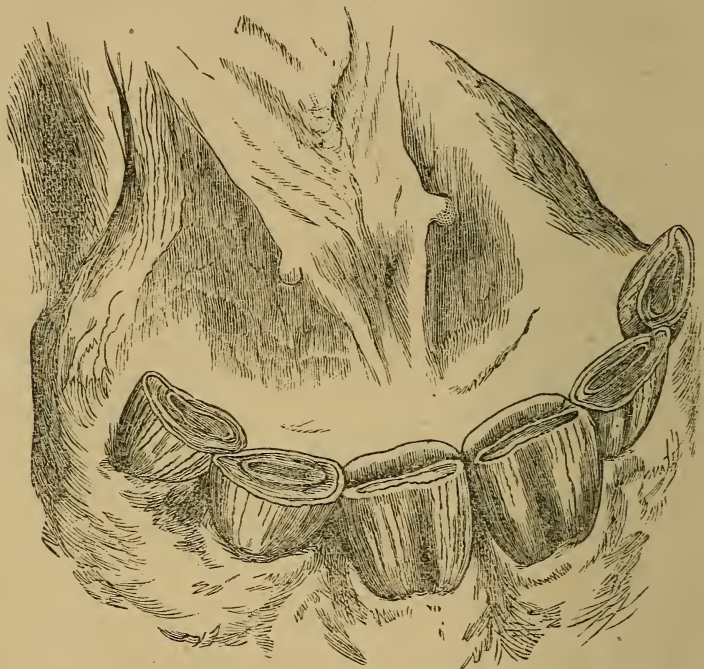


INCISORS OF TWO-YEAR-OLD.

“When an incisor first comes up the hollow affords lodgement for the debris of the food, and the juices expressed from it, and therefore soon looks black. As the tooth wears down the hollow of course disappears; but the surface of the dentine immediately below the original hollow, being a somewhat soft material, has become stained for some distance down. Thus there is still a black mark. With the further wear of the tooth the stained portion of the dentine wears away, and the mark is then said to

be out. The mark, as the reader will easily see from this description, is in a constantly changing condition.

“Premising that the time which the mark will take to wear out will vary to a greater or less degree, according to circumstances to be detailed hereafter, we shall now endeavor to give some general rules for guidance.



INCISORS OF THE THREE-YEAR-OLD.

“Between three and five years old the marks are very plain in the permanent incisors. At six, the marks are wearing out of the two centre teeth, which came up at three years old. They are plain in the two next, and perfectly fresh in the two corner teeth.

“At SEVEN the marks have disappeared from the centre teeth, are wearing out of the two next, and are distinct and plain only in the two corner teeth.

"At EIGHT the marks have disappeared from all but the corner teeth, in which they are becoming indistinct.

"At NINE the marks are not usually found in any of the teeth.



INCISORS OF THE FOUR-YEAR-OLD.

"For about two years after the mark has disappeared in each tooth there may still be seen in the form of a star a trace of the enamel which lined the bottom of the original hollow, and which underlies it for some depth. The star of course decreases in size with the wear of the teeth. At about twelve or thirteen the last

traces of the enamel have usually disappeared even from the corner teeth, but it may remain for some time longer.

“Many casual circumstances, however, cause a certain degree

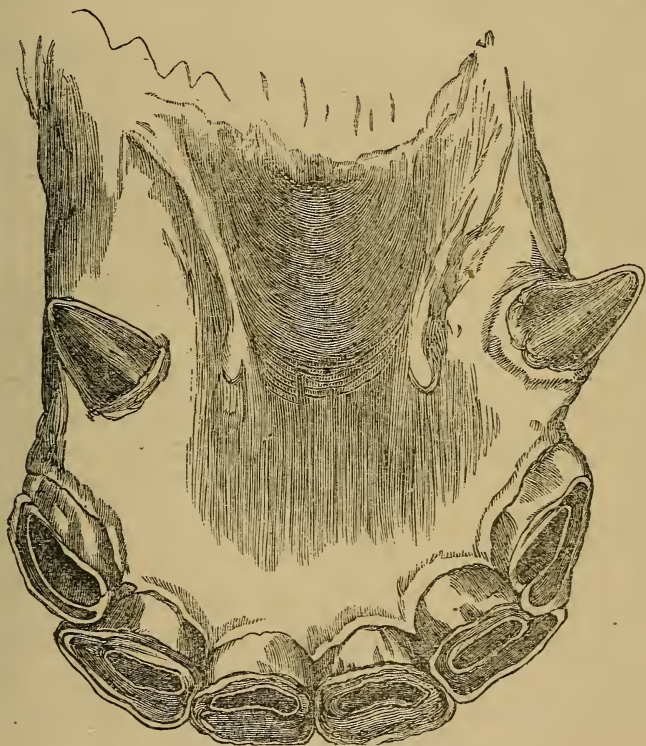


INCISORS OF THE FIVE-YEAR-OLD.

of deviation from these general rules. The time which the mark takes to wear out will vary in different horses, according to the hardness or otherwise of the teeth, and according to the hardness of the food on which the animal is kept. In grass-fed horses the

marks usually remain at least a year, and sometimes two years longer than in those fed on hard food. Again in parrot-mouthed horses, that is, where the upper overlaps the lower jaw, the marks may remain for many years.

“On the other hand some horses, which have a trick of biting



INCISORS OF THE SIX-YEAR-OLD.

the manger, may wear down their teeth very rapidly, and therefore lose their marks very early. Horses fed on salt-marshes, where the sea-sand is washed up among the grass, or on sandy plains or meadows, are affected by the increased friction on the teeth caused by the sand. Occasionally a projecting tooth in the upper jaw may cause unusual friction on the corresponding tooth

of the lower jaw, and so may hasten the obliteration of the mark.

"Most of these, and other causes of irregularity of wear which might be mentioned, are at once apparent to a careful and accurate observer, and will scarcely prevent his forming a pretty correct opinion of the age.

"The upper incisors, as previously stated, are considerably longer and larger than the lower, and the infundibulum is nearly twice as deep; the marks therefore remain longer than in the lower teeth. We mention this in passing, lest the reader should be misled if he should by chance refer to the indications given by the upper teeth to corroborate or correct any opinion as to age, about which he may be in doubt from the appearance of the lower jaw.

"Occasionally the dentine on the side of the infundibulum may become stained, and even black, and in such cases something like a double mark may be observed.

"The mouth taken as a whole is broader at seven years old than at any other period. After this it gradually narrows with age.

"*Bishoping*.—Marks on the incisors are occasionally simulated by means of caustic or the hot iron, by low dealers, with the view of deceiving the unwary. The fraud is readily detected, because, though it is easy to make a black mark on the crowns of the teeth, yet it is impossible to restore the wall of pearly enamel, which, as explained above, surrounds the natural mark.

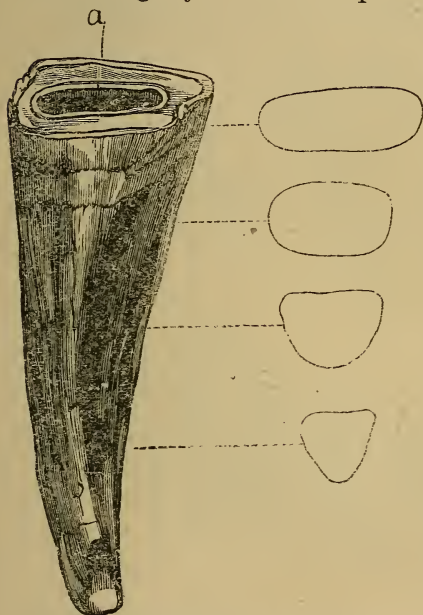
"*The Fang-hole, or Secondary Mark*.—At about nine years old, in consequence of the wearing down of the teeth, a slight trace of the fang-hole usually appears in the centre teeth, and somewhat later in the other teeth. It is indicated by a slight discoloration of the tooth at the above point. There is, however, no actual hole, because with advancing years the upper part of the original cavity has become filled up with a sort of spurious dentine, which is more yellow than the true material, of which the body of the tooth consists. As age increases this indication of the fang-hole, which is sometimes called the 'secondary mark,' becomes rather more plain. It, however, affords no reliable data

by which to judge of the age, and is only mentioned in this place lest the reader should mistake it for the remains of the infundibulum. The enamel, it will be remembered, is pearly white, whilst the mark of the fang-hole is brownish-yellow.

"It will be seen that at about nine years the 'marks' entirely fail us; and, indeed, after seven or eight they can hardly be said to afford any reliable data.

"From eight years old and upwards the best indications of the age are given by the gradual alterations which take place in the shape of the teeth from wear, and in the closing of the mouth.

"The teeth originally are *broad laterally* at their upper surfaces, otherwise called their crowns or 'tables,' and thin from front to rear. They narrow gradually towards their necks and fangs, while they increase in depth from front to rear. Hence, as their upper surfaces wear off, the teeth become narrower and deeper year by year. In very old horses there is often a



SHAPE OF THE SURFACE OF THE HORSE'S TOOTH AT DIFFERENT AGES.

positive interval between the teeth, and they appear like triangular sticks in the jaw.

"The gradual effect of wear in producing this alteration is shown in the accompanying diagram, where successive portions of the upper surface of the tooth are represented as having been removed by the saw, and their cross-sections are shown at the right-hand.

“The amount of wear on the upper surface of the teeth is greater in the young mouth than it is afterwards, because in youth the teeth meet more fairly than they do in after years. It gradually decreases as years increase, because the teeth do not meet so directly, but, on the contrary, project more and more forward in something like two parallel lines. For example, a

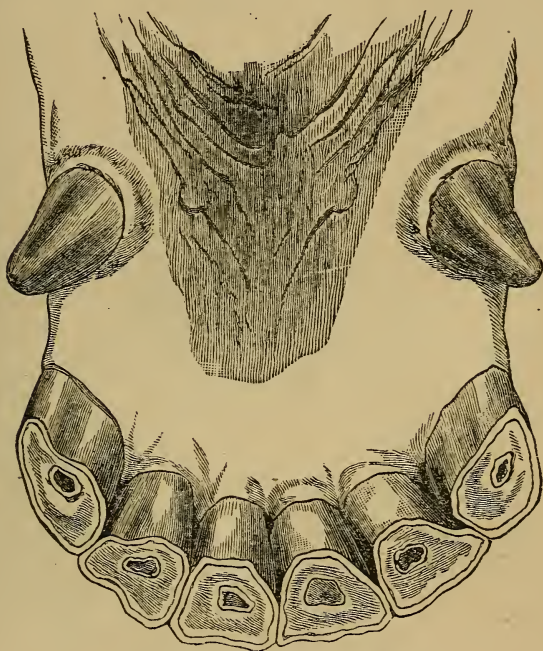


INCISORS OF THE SEVEN-YEAR-OLD.

quarter of an inch will usually be worn off the surface between five and six years old, whilst probably not more than that quantity will be worn off between twenty and twenty-five years old.

“At six and up to eight years old, the teeth are all broad laterally at their upper surfaces. Up to this time the exact year, as the reader will recollect, is pretty well known by the marks. At nine, when the marks fail, the alterations in the crown surface

or table come to our aid. The two centre teeth, which came up at three, become somewhat triangular. At ten the two next teeth show similar signs. At eleven the corner teeth have become somewhat triangular. At twelve the triangularity has increased in all the teeth. This alteration continues to increase in all the



INCISORS OF THE EIGHT-YEAR-OLD.

teeth until in very old horses the depth from front to rear exceeds the lateral width of the teeth.

“Again, as age increases, the teeth, notwithstanding they really wear down, become apparently longer. This effect is due to the fleshy parts of the gums receding faster than the teeth wear down. In extreme age, however, when the gums have receded as far as they can, the effect of wear causes the teeth to become visibly as well as really shorter.

"An alteration also takes place in the position or 'slope' of the teeth as regards their closing. This is due to the effect of wear. Owing to the curved shape of the tooth its upper portion is nearly perpendicular, whilst the lower part lies in a more horizontal position. Hence in youth the teeth meet directly, whilst in extreme age they can scarcely be said to meet at all. Their stumps project forward in two almost parallel lines.



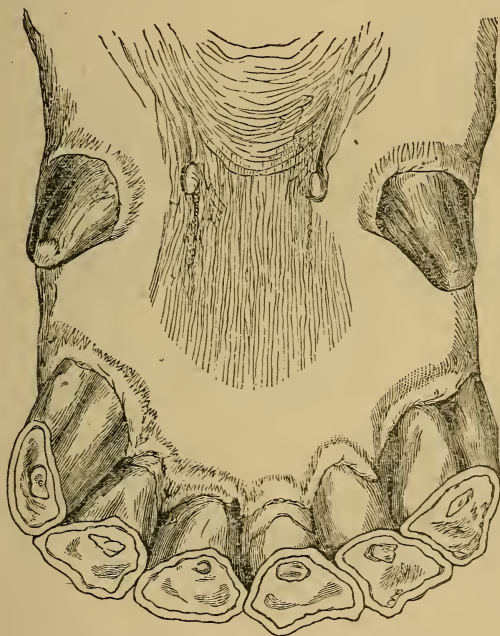
INCISORS OF THE TEN-YEAR-OLD MARE.

"Up to twelve years old there can scarcely be much difficulty in forming a pretty correct judgment as to the age. After that time it requires more time, practice, and opportunity than most people have at disposal, to obtain the requisite knowledge.

"It would probably scarcely interest the non-professional reader to trace very minutely the changes which take place after twelve years old. Suffice it to say, that the gums continue year

year to recede, the teeth become *apparently* longer and *really* narrower, and consequently the intervals between them increase, and they project forward more and more in a straight line.

"At about twenty-four, and in some instances a good deal sooner, the teeth, which up to this period have apparently increased in length, begin to grow visibly shorter, because the gums are so far absorbed that they can recede no further. Hence all fur-



INCISORS OF THE TWELVE-YEAR-OLD.

ther wear shows its effects by diminishing the length of the teeth.

"*Loss of Circularity.*—In the very young horse the teeth are arranged almost in the form of a semicircle. Year by year this form changes, until in old horses the teeth are arranged in something like a straight line.

"*The Tusks.*—In horses, as distinguished from mares, great assistance in determining the age is derived from the presence of

the tusks, which are generally wanting in the latter. The tusks usually begin to appear in a very slight degree at about three and a half or four years old. Their sharp points then just pierce the gums, and they continue to grow until fully developed at about five or five and a half years old. They do not meet like other teeth, and therefore do not suffer wear from that cause. They suffer, however, from wear in the course of mastication, and in

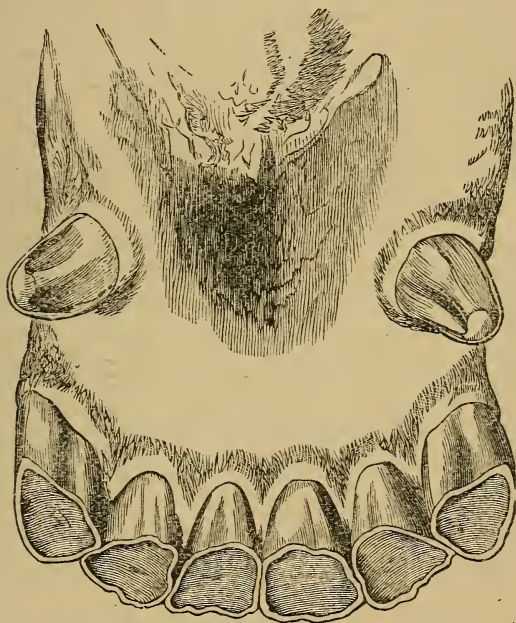


INCISORS OF HORSE (EPIRUS) AT NINETEEN.

fact undergo greater changes than any other teeth, and so form a valuable guide as to age.

“The tusk is a very peculiar-shaped, elongated tooth. Internally it consists of dentine, and is protected on the outside only by enamel. The enamel, however, overlaps the dentine, and hence arises the sharp edge or hook of the newly-developed tusk, which may be felt if the finger be brought round it from behind.

"The sharpness gradually wears off. After seven it has disappeared, and in each succeeding year the tusk becomes not only rounder and blunter, but its upper portion wears off. It also appears yellow, on account of the dentine becoming exposed by reason of the enamel wearing off its exterior surface. The tusks, unlike other teeth, do not apparently increase in length



INCISORS OF HORSE (KREMLIN) AT NINETEEN.*

with years, but become shorter and shorter. In fact the effect of wear is greater on them than on other teeth, and it is also greater than the process of the receding of the gum. In very old horses

*The two cuts illustrating the mouths of "Epirus" and "Kremlin" are given by Prof. Brown to show the differences in appearance which may exist in the teeth of aged horses when there is no corresponding difference in years, these horses being of the same age, although "Kremlin" would be taken to be the older by most observers.

the tusk is very little above the level of the gum. Mares sometimes have four small rudimentary tusks.

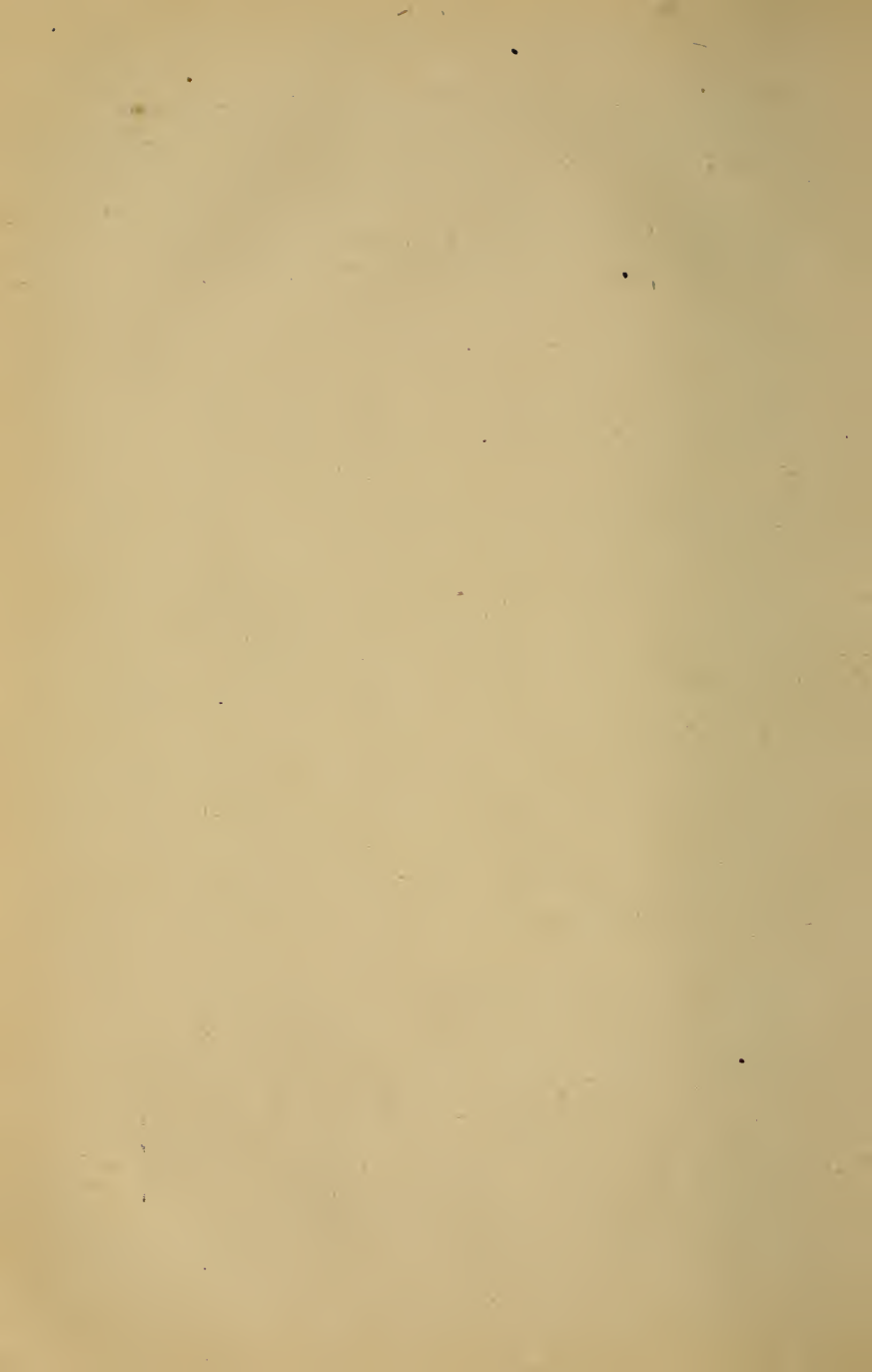
"In judging of the age of the horse by the teeth, every collateral circumstance requires to be taken into consideration, such as the form of the mouth, the way in which the teeth meet and close on each other, the food on which the animal has been kept, any irregularity in the upper teeth which may cause increased or diminished wear on the lower teeth, and also the habits of the horse in the stable. The teeth of animals which bite at the rack or manger whilst being cleaned, invariably present appearances of wear beyond their real age.

"The body also presents many indications of the age which may assist us in forming an accurate opinion, and sometimes may enable us to correct an erroneous impression produced by some abnormal appearance of the teeth. The young horse is fleshy about the gums and head, and the hollow over the eye is shallow. Year by year, as age increases, the gums lose their fleshiness, the head becomes more lean, and the hollow over the eye deepens. The shoulders lose much of their thickness and become finer, and assume an appearance of greater length. The hind-quarters in like manner lose some of their roundness, and the animal generally gains an appearance of more breeding than he had in his younger days. The back becomes more or less hollow, a result partly due to the effect of weight, especially in long-backed animals, and partly to loss of fleshiness in the muscles which run along the spine.

"Again, as the horse becomes old, the fulness of the chin under the mouth disappears. The inferior margins of the branches of the bone of lower jaw also become thin. Lastly, the general appearance of the aged horse is much influenced by the work he has done, and the treatment he has received.

"Age must not be judged by any one sign, but by a mean judiciously-struck between all the signs, and by a careful consideration of all the collateral circumstances. It never happens that all the signs combine together to deceive a careful and well-informed observer."

“From these pages the reader will perceive that after six years old; that is, after the structural changes in the mouth are completed, it is impossible to lay down any single definite rule by which the age can be ascertained. Still, with a little trouble and attention, there is no real difficulty in acquiring a knowledge of the horse's age up to a comparatively late period of his life.”



PART IV.

A TREATISE

ON THE

DISEASES OF HORSES

BY

ALFRED TINKLER WILSON, V. S.,

SPRINGFIELD, OHIO.

PART IV.

THE DISEASES OF HORSES.

BY A. T. WILSON, V. S.

In the following pages it is not intended to criticise the opinions and modes of practice of those who have gone before us; on the contrary, we have heartily to thank them for their labors. Our effort shall be to simplify treatment as much as possible, to bring it more in unison with the wants of the country in which we live, and, above all, to save the unfortunate horse from unnecessary "meddlesome medication." Neither is it intended to assist in the manufacture of "horse doctors," who are already too numerous; these pages are simply intended as a guide to the intelligent horse-owner in the hour of need, and as such it is hoped that they will prove acceptable. In no respect are they to be considered as a complete work on the subject, and the author's principal claim is his long experience (more than fifty years) as a practitioner of veterinary medicine and surgery.

OPHTHALMIA.

Commencing with the horse's eyes, we will first consider the disease commonly called *moon blindness*.

Symptoms.—The lids of one or both eyes—generally but one—are swollen and closed, and the horse cannot bear the light; the insides of the lids are red and inflamed, the eyeballs look "milky," and tears run down.

Causes.—The cause is in most cases hereditary, but the affection may also be produced by the irritation caused by hay-seeds, dust, Spanish-needles, the *moon* and *wolf teeth* (the last two being considered under the light of "moonshine.")

Treatment.—We recommend thorough bathing with water made as hot as can be borne by the hand; excluding the light by a shade of wet woollen cloth, or by leaving the horse in the stable during treatment. At night the outer parts around the eye may be bathed with a lotion composed of one drachm of sulphate of zinc, dissolved in one quart of water. The feed should be soft bran mash, made by wetting bran with cold water in which nitre has been dissolved, at the rate of half an ounce to a gallon of water. The horse may have hay or cut grass, but should not be turned out to grass. He may be worked moderately if his eyes are shaded. This disease is very deceiving; the eye may clear up and appear to be well, but will soon be as bad as ever again, and these fluctuations will continue until complete blindness in one or both eyes ensues.

HOOKS.

Inflammation of the *membrana nictitans* is by common folks called *hooks*; and we think they are very sensible in doing so, although we rather like a little Latin now and then, because it looks ornamental. This membrane is the third eyelid, or washer, referred to on page 94, whose use is to wash or clear the eyes of foreign substances.

Symptoms.—The membrane seems considerably enlarged, is red and inflamed, and spreads more over the eyeball than usual, not returning to its place as in health.

Causes.—Principally cold drafts, such as those produced by cracks in the side of the barn, open doors, etc., facing storms, and a disordered state of the blood. Cases of lockjaw are often mistaken for hooks.

Treatment.—Whoever proposes to cut out the hooks should be treated with contempt, and, if caught in the act, should be arrested, under the act for the prevention of cruelty to animals; yet no mawkish sentimentality should prevent the performance of necessary surgical operations by competent men.

The outer edges of the eye should be diligently bathed with

hot water, and I will here say that whenever hot-water bathing is recommended—and that is pretty often—the water should be as hot as can be borne by the hand, and should be diligently and well applied. If a man thinks he has done a good job by merely wetting the parts he is very much mistaken. The horse should be fed on a cooling diet, such as bran mash. These bran mashes are made by pouring boiling water over wheat bran until it is thoroughly scalded, when it is covered until cool enough to use. In some cases cold water is preferable.

BIG HEAD.

Osteo sarcoma is the proper name of this disease, and it is chiefly met with in the middle and western States. Pennsylvania, Ohio and Indiana seem to have more than their share.

Symptoms.—A swelling of the bones of the face extending from the eye to the nose, and in many cases causing great disfigurement and inconvenience. The horse seems stiff in the joints, weak and not inclined to move.

Causes.—The causes are not known, but are supposed to be the constant use of corn for feeding purposes.

Treatment.—With us all attempts to cure this disease have failed or proven unsatisfactory. We have heard of cures by the use of the cautery (red-hot iron) and also by making an incision on the most prominent portion of the enlargement and inserting arsenic; but how these methods are to clear the system of the disease, or reach the fountain head, we do not understand.

LAMPAS.

Close behind the front^s teeth in the upper jaw we may perceive a sort of baggy projection of the palate, which is often higher than the level of the teeth, and is sore and tender. This is what is called the lampas. It is generally incident to the teething process, but older horses frequently have the same affection.

Symptoms.—In connection with those described, the horse

refuses to eat, or attempts to do so, but drops the food from his mouth.

Treatment.—Feed the horse on soft feed—boiled oats, brar mash, etc.—and in every bucketful of the water he drinks dissolve a tablespoonful of nitre.* No burning, cutting nor other barbarism should be allowed.

APTHA.

This is better known under the general name of sore mouth and should receive attention, as the horse is liable to suffer from lack of nourishment.

Symptoms.—The horse refuses to eat, and small, puffy swellings are found under the tongue and around the sides of the mouth inside.

Causes.—Injuries from the bit, too tight checking up, feverishness resulting from teething, rough corn, cuts from the sharp edges of corn stalks and improper *doctoring*.

Treatment.—Give warm, soft feed and nitre-water, and swab out the mouth two or three times a day with a strong solution of alum.

WOLF TEETH.

Wolf teeth are incident to all young horses, and give them far less trouble than they appear to give their owners. They will drop out in due time, and do not injure the horse's eyes any more than they do his tail. (See page 100.)

JAGGED AND DECAYED TEETH.

When horses get old they are liable to get uneven, sharp, or projecting teeth; these should be rasped down with a tool made for the purpose. Decayed teeth should be extracted, but such cases need a veterinary surgeon. The symptoms of decayed or uneven teeth are the dropping of the food in the form of a quid, hence the term *quidder*.

*As this use of nitre or saltpetre will be frequently recommended, it will be referred to simply as nitre-water.

ADENITIS.

This name, first adopted by Mr. Armitage, V. S., of London, is much more appropriate and intelligible for glandular inflammation than such unmeaning terms as "horse distemper," "strangles," "colt distemper" and "horse-ail." The disease is incident to all young horses, and in some respects resembles the "mumps" of children. When it appears late in the spring and in fine weather young horses seem to get along without difficulty, but in the early spring, when the snow is drifting over the glassy surface of the prairie, the poor colt, with his tail to the wind which is whistling through his only shelter—a rail fence—surely needs our attention.

Symptoms.—Loss of appetite; gulping loudly when drinking; coughing, with evident pain; saliva dribbling from the mouth; nose extended as with poll-evil; swelling of the glands below the ears (parotid) and between the jaws (maxillary), and difficulty of breathing.

Causes.—Unknown.

Treatment.—Keep the colt in a sheltered place (not too warm), and if he can swallow try him with a little linseed mash,* boiled oats, or other soft feed; give him nitre-water to drink, fastening the water-pail in his feed-box so that he may drink at his leisure. In mild weather the glands may be bathed with hot water, but in cold weather it is better to rub them with a mild blister-ointment. When the centre of the abscess beneath the jaws is soft (not before) make an opening with a sharp knife large enough to put the thumb into, and let out the pus or matter.

CHOKING.

This accident is of common occurrence, and no time should be lost in attending to it. If a veterinary surgeon can be had it is better to give the case to him.

* *Linseed mash* is made by putting a peck of flaxseed into a large vessel—as a wash boiler—filling up with water, and simmering for eight to ten hours, and when cool adding about a quart of this to six quarts of bran.

Symptoms.—The horse stands with his fore legs stretched forward; he contracts the muscles of his neck with great force; a ropy fluid runs from mouth and nostrils, and his look is haggard and distressed.

Causes.—Eating too fast; pieces of corncob, etc., lodging in the gullet; oats, bran, etc., getting into the windpipe.

Treatment.—First pour down a pint or so of raw linseed oil, olive oil, or melted lard; feel with your fingers on the outside of his throat for a corn cob; not finding any, cut the top off your buggy-whip and tie a piece of soft leather or sponge firmly to the whip, dip it in lard, and insert it gently, first drawing out the tongue. This and manipulating with the hand sometimes succeeds; if not, continue the oil.

CRIBBING.

Cribbing is biting at the manger or other projections.

Symptoms.—The horse, when in the stable, will bite or merely push the front teeth against the feed-box or stall, at the same time giving a little grunt. When in pasture he will do the same against posts, fences, etc.

Causes.—Idleness, indigestion, playfulness and imitation of other cribbers.

Treatment.—Place the horse in a box-stall lined with boards about eight feet high, so that there shall be no projections of any sort; give him his hay on the floor in a corner and his feed in a large iron pot, also on the floor. When out keep him checked up or away from projecting woodwork of any kind, and remember that “eternal vigilance” is the remedy for a cribbing horse.

WIND SUCKING.

Wind sucking is merely a form of cribbing.

Symptoms.—The horse stands with his nose bent inward, and nibbles with his lips, as if trying to catch a straw. He seems to imbibe air, but this is doubtful. Horses having the habit are

subject to flatulent colic, but whether indigestion causes wind-sucking, or *vice versa*, is a question as yet unsettled.

Causes.—Same as those of cribbing.

Treatment.—A leather strap about two inches wide may be buckled around the throat as tight as the horse can bear without danger of choking; this will prevent him from bending his neck. The strap need only be worn in the stable, unless the horse indulges the habit while in harness.

POLL-EVIL.

Symptoms.—A few inches behind the horse's ears, and on one or both sides of his neck, an enlargement of considerable size appears; the horse extends his nose, and his neck becomes stiff.

Causes.—This affection is frequently caused by blows or by bruises, received by striking the head against the beams overhead, the edge of the feed-box, or the top of a low doorway, or by pulling at the halter. It is also sometimes due to hereditary scrofulous taint.

Treatment.—The diligent application of hot water several times a day, and an hour each time, will often scatter the swelling, if attended to in time; but if this opportunity be allowed to pass the abscess becomes a fistula, and sinuses form. When this is the case a veterinary surgeon should be consulted immediately, as the fistula will require to be freely opened, and a removal of the sinuses will be necessary to complete cure.

COUGH.

A cough is frequently found in connection with other diseases, and we must endeavor to trace it to its source.

Causes.—Among the causes of coughing are lung fever, pleurisy, bronchitis, consumption, hydrothorax, epizootic, worms, heaves, sore throat, damp stables, musty hay, shedding the hair, changes of weather, indigestion, noxious gases, sudden cooling after overheating, etc., etc.

Treatment.—The horse should be kept quietly in the stable, and fed on boiled oats, linseed mash, etc. The kidneys may be stimulated with nitre-water.

SORE THROAT.

This disease is often the forerunner of others of a very serious character, and the horse-owner is advised to pay attention to it in time.

Symptoms.—When the horse lowers his head to drink he jerks it up again quickly, as if the water was hot, and makes a clucking noise at the same time. He smells of his food and seems hungry, but does not venture to swallow.

Causes.—Changes of weather, exposure to storms, shedding the coat, etc.

Treatment.—Hot-water bathing, judiciously applied, the throat being well dried by rubbing with a dry cloth after each bathing, and kept covered between times with woollen cloth, is good. A mixture of equal parts of aqua ammonia and raw linseed oil may be gently rubbed around the throat, and a piece of flannel fastened around. The food should be boiled gruel, made thin enough to either eat or drink. No hay or other rough feed is needed until the horse begins to nibble.

LARYNGITIS.

This is an inflammation of the larynx, and the larynx is at the top of the trachea or windpipe. (In the figure on page 88 the trachea is seen lying beneath the œsophagus, and the larynx lies immediately under the pharynx.) The progress of the disease is rapid and alarming, and its result often fatal.

Symptoms.—If sore throat has been neglected or wrongly treated, we find the horse is getting worse, and the case soon assumes a strongly marked character; the breathing is attended with a loud, snoring noise, and eventually becomes so difficult that the horse seems about to fall; as the disease progresses the horse

breathes with a whistling sound, like the escape from a steam-valve; he stamps with his fore feet, and finally reels and falls dead of suffocation.

Causes.—The causes are the same as those that originate sore throat.

Treatment.—No medical treatment will avail after the disease has reached the stage of heavy breathing described. The only remedy is the operation of tracheotomy, and therefore a veterinary surgeon should be procured as quickly as possible.

VERTIGO.

Symptoms.—Sometimes when a horse is being driven he shakes his head and hangs back, or turns to one side, or acts as if there were something in his ear. If he be allowed to stop and rest, the trouble may pass away, but if he be kept going he will soon stagger again, and probably tumble over, when he may lie like a drunken man, or plunge violently until he regains his feet, and then go off as if nothing had happened. During the attack he seems quite unconscious.

Causes.—These are various, including high feeding, idleness followed by sudden exertion, tight collars, checking too high, hot or “muggy” weather, and hard driving on a full stomach.

Treatment.—Get the horse out of the harness and let him alone until thoroughly rested.

PHRENTIS.

This is inflammation of the brain, and in its worst stages is frightful to look upon, and the horse cannot be approached without great danger.

Symptoms.—The first thing noticed may be the refusal to eat; the horse appears sleepy, and leans his forehead against the front of his stall as if he had a bad headache; he staggers when moving, and looks so drowsy that he is said to have *sleepy staggers*. After some time he will start suddenly, as if frightened, and will

rear and snort and nicker, and plunge around in the most fearful manner. He is then said to have the *mad staggers*.

Causes.—Too much grain or hay; too much fat; too much working on a full stomach.

Treatment.—The administration of medicine while the horse is in his frenzy is manifestly impossible. He should be turned into a large open lot and let alone.

SOFTENING OF THE BRAIN.

Softening of the brain is a very serious matter, and the horse should be disposed of at once. Trust no lady with him. Cases of this disease are by no means uncommon. They are called *dummies* by the horse jockeys.

Symptoms.—In young horses this disease is frequently mistaken for awkwardness. The horse will sometimes suddenly stop, and try to knock his head against something; if wanted to turn he will go straight ahead, regardless of all tugging at the bit; when he stops he will stand stock still, exactly as his feet happen to be at the moment; he may bear to one side, or run up against a fence or building, in spite of all the driver can do; in the stable he may get across the stall, or get his feet in the manger, or get entangled in the halter, and cut his heels or break his neck (a consummation devoutly to be wished!)

Causes.—Not always known, but these symptoms sometimes follow sunstroke.

Treatment.—None of any service, and the animal is worthless.

CEREBRO SPINAL MENINGITIS.

Within the last thirty years this disease has appeared at various times in the United States, and has made fearful havoc in the large cities. It is a disease of the brain and spinal cord.

Symptoms.—In most cases this disease seems to come on slowly. Perhaps for several days the horse may seem weak and uneasy in his hind legs, tender along the backbone, and inclined to stagger

when turning. After a while he gets down and lies quiet and exhausted, or struggles occasionally. He grinds his teeth and is very nervous.

Causes.—The causes of this disease are not well understood. It is believed to be epizootic, and is communicable from one horse to another.

Treatment.—We know of none better than good care. Give nitre-water, and let the horse drink all he wants. Bathe along the spine with whiskey and water, equal parts, gently rubbed in.

TETANUS.

This disease is better known as *lockjaw*. It is a disease of the nervous system, and, like other diseases of the same class, is fatal in its effects and distressing to look upon.

Symptoms.—The first symptom likely to attract attention is that the horse seems stiff, as if he were foundered; he extends his nose, as if he had poll-evil; his eyes seem sunk in his head, and if you raise the head the “washer” in the corner of the eye will slip half-way over the eyeball, and then the “doctors” say he has the “hooks.” This symptom is a sure guide. His ears stand up as if they were made of sheet iron; his tail quivers and stands out; he turns around stiffly; he cannot lie down, but may fall down, and if he does he will fall like a wooden table, and it is likely to be his last fall.

Causes.—Running nails into the feet is the most frequent cause, but kicks, blows, bites, runaway accidents occasionally cause this disease, and we sometimes ascribe it to a “cold.”

Treatment.—In the treatment we must use judgment and common sense. The entire nervous system seems to be strung up to its highest tension, and when the horse is approached, even quietly, he seems to be afraid. The rustle of the straw, even, will alarm him, and he will jump backwards at the most trivial motion. To tranquilize the system, then, is the main point. Place him in some building secluded from noises and other animals; fasten a bucketful of cold oatmeal gruel in his manger,

and give some grass or wetted hay, if his jaws are not entirely closed. The sympathy of outsiders strongly inclines them to *doctor* him for something, but quiet attendance once a day is all that is really necessary.

RABIES.

This is canine madness, better known as hydrophobia, and, like most other diseases of the brain, is both distressing to contemplate and dangerous.

Symptoms.—The first symptoms generally appear from two to six weeks after the inception of the disease. The horse has a wild look; he screams, nickers and bites, and snaps at anything within reach, and has strange twitchings about the lips. He strains to pass excrement, both liquid and solid, and is dangerous to approach.

Causes.—The bite of a mad dog, generally, but the bite of any other rabid animal will produce it.

Treatment.—A bullet, administered without delay.

CRAMP.

This is of very common occurrence, and may show itself in various ways, all sufficiently alarming. We remember going sixteen miles in pouring rain, at midnight, to see a horse of great value with his *stifle out*. While the owner was gone for a light we gave the horse a smart rap with a broom handle, and when the light came the horse was cured.

Symptoms.—The trouble most frequently occurs in the hind legs, in the stifle joint especially. It sometimes comes on suddenly in turning or moving the horse, and a sudden scare will sometimes affect a cure. Cramp of the whole body frequently occurs in lockjaw.

Causes.—A spasmodic action of the muscles, due to various causes, and aggravated by too long confinement in the stable without exercise.

Treatment.—None of any use, except close attention to diet and exercise.

SUNSTROKE.

Horses, fat horses especially, are frequently sunstruck, sometimes falling suddenly, at others giving warning.

Symptoms.—The gradual approach of sunstroke is indicated by the lagging of the horse at his work; he disregards the word or whip; soon stops entirely; holds down his head, pants, and staggers; when this occurs the harness should be immediately removed, and the horse led to a shady place.

Treatment.—It is not necessary to rush around in an excited manner, for the horse wants a little time to rally. Whether he is standing or lying down, let him alone for a while; then pour cold water on the top of his head and along his back. It will be also well to pour quietly into his mouth a mixture of two ounces of either sulphuric or nitric ether and a quart of cold water.

PARALYSIS.

Symptoms.—The horse is sometimes found in the stable unable to rise to his feet, and this occurs generally in the morning. If you look around you may see some signs of a "scrimmage," such as broken woodwork, buckets knocked over, etc. The horse is often found stretched out his full length, and apparently taking things philosophically, but you will find that he has not the power to rise. If the horse is on his feet, or working, when first noticed he will seem fidgetty, will look around toward his hind parts, which will appear weak, he will knuckle over at the pastern joint, will sweat profusely, and finally fall, when he will probably remain quiet, except with his fore legs.

Causes.—Indigestion, injuries to the spine, hard pulling, severe exertion after long idleness, and high feeding.

Treatment.—If in winter, have the horse placed in a roomy box stall, or on a barn floor, well bedded, and protect his head with bundles of straw. If in summer, he may be left in a grass-lot.

He should be turned over twice a day; his feed should be bran and oats, with wetted hay or fresh grass and plenty of water. At the beginning of the attack the bladder should be emptied with a catheter; the spine may be bathed with whiskey and water, and ten drops of the tincture of nux-vomica, mixed in half a pint of water, may be given every day.

AZOTURIA.

This is a disease of the system generally, but is characterized by very dark urine, and occurs most frequently in mares during heat.

Symptoms.—An attack of this kind is generally sudden, and often occurs while at work. The horse sweats profusely, knuckles over at the hind pastern joints, and soon falls. He is flat on his side, stretching out his hind legs and head, and soon shows that he is utterly unable to rise on his feet, except, perhaps, that he may rise on his fore feet. The breathing is often quick and distressed, and the muscles of the hind-quarters are swollen and quite hard to the touch. It is a disease which very much puzzles the owner, for the animal may lie apparently easy, after the first day, and will eat and drink almost as usual; but it has no power to rise, nor to stand, if lifted to its feet. One fore-leg is generally kept in motion.

Causes.—Although this disease is usually attributed to sexual heat, we have had a great number of cases among geldings, and we have observed that it very often occurs after the horse has been for some time idle and is suddenly put to work, especially when corn has been liberally fed.

Treatment.—The catheter should first be used to empty the bladder, which gives great relief at once. The urine will be found to be of a very dark color, similar to strong coffee. Some have supposed this color to be due to blood, but that is a mistake. The next thing is to give a full quart of raw linseed oil, with two ounces of spirits of turpentine mixed and shaken up in it. Next give an injection of warm water—say six quarts—containing a

pint of linseed oil, or an ounce of barbadoes aloes, or half a pound of bar soap. The horse should be kept well bedded, and should be turned over once or twice a day.

CATARRH.

Catarrh, when accompanied by a clear discharge from the nostrils, is ordinarily called "cold in the head."

Symptoms.—The eyes seem tender and watery; there may be a slight discharge from the nose, and there may be a slight cough; the horse seems dull and stupid, does not care to eat, and has not the least disposition to play.

Causes.—Sudden changes of temperature; exposure to wet and cold; change from country to city; changing the coat, etc.; traveling on the cars, and especially too sudden cooling after active exercise.

Treatment.—The horse should be kept in a comfortable but well ventilated stable; the action of the skin should be stimulated by vigorous currying, and he should be put to no labor until well. His food should be boiled oats and linseed mash, with nitre-water, or water containing linseed tea (a quart to the pail of water) for drink.

NASAL GLEET.

All discharges from the nose, in horses, should be regarded with suspicion, for they are sometimes the beginnings of serious diseases.

Symptoms.—A discharge from the nose which has existed for some time and become chronic in character, especially if tinged with bloody streaks and accompanied with matter or pus, indicates the presence of this disease.* The lining membrane of the nose assumes a brick-red color, and the horse loses flesh.

Causes.—Confirmed catarrh; insufficiency or poor quality of food; general neglect.

Treatment.—Remove the causes; feed liberally and keep well groomed; keep the nostrils well sponged out, and mix in his food

once a day a level tablespoonful of sulphate of iron (copperas) or sulphate of copper (blue vitriol.)

GLANDERS.

Glanders frequently succeeds nasal gleet, and the casual observer sees no particular change; examination, however, shows that, although not always perceptible, the destructive force has steadily progressed, and, whether the disease has succeeded nasal gleet, or has been communicated by inoculation, the characteristics of glanders soon become sufficiently marked, at least for the experienced eye. If a horse is supposed to have glanders the owner should lose no time in having him examined by a veterinary surgeon; for the risk of handling a glandered horse is about as great as sauntering through a powder-mill with a lighted cigar in your mouth. Feeding, cleaning, working, or handling him in any way is done at the risk of your life. As an instance in point, some years ago I met a man driving a team of good farm horses, and stopped him to make some inquiries. While talking to him I noticed that both horses had a discharge from the nose, and, on close scrutiny, discovered that they were glandered. I tried to explain the case and warn the driver, but he was a German and could not clearly understand me, and merely laughed and shrugged his shoulders. He was a stout, florid, healthy looking man. In about three weeks afterward I learned that he was dead, and the report from three physicians was that he died in a loathsome condition from glanders.

Symptoms.—The early symptoms are like those of nasal gleet, but after a while the discharge becomes stinking, or it may be mixed up like glycerine, blood and matter, with no smell. Looking up the nostril we may see round ulcers, here and there, on the division or septum of the nose. These, however, are not always present. Between the jaws, on the inside of the jaw-bones, a little back of the centre, we may find a hard knot, about half the size of a hickory nut, which seems stuck to the bone. This, if the horse is poor and wasted-looking, and the knot on the same

side as the discharge, settles the verdict. In chronic cases of glanders the horse is often fat and sleek, and able to work, and these cases are most liable to deceive the unwary.

Causes.—Contagion, cold, wet, filth, neglect.

Treatment.—In the hands of a good surgeon, and under favorable surroundings, it is possible to cure glanders; but to those for whom this treatise is written we would say, don't attempt it, but administer a bullet without delay.

Glanders is transmissible to men only through abrasions of the skin, but a pin scratch is sufficient inlet for the admission of the poison, hence the danger of handling horses affected with this disease.

FARCY.

Farcy is very nearly akin to glanders, both in origin and termination. Many horses that are attacked in a mild way, and properly cared for, recover; but it is a disease that requires close watching.

Symptoms.—In mild cases we may perhaps first notice round, hard blotches, or tumors, coming on the inside of the thighs and along the neck. They often resemble blood-warts, so called; this form is popularly called *button farcy*. If this is not checked the legs and sometimes other parts may become enormously swollen; foul smelling ulcers appear, and there is a stinking discharge from the swollen nose.

Causes.—The same as those of glanders.

Treatment.—In mild cases the horse should be well fed and cared for, with the same treatment recommended for nasal gleet. In severer cases, a bullet.

PURPURA HÆMORRHAGICA.

This is a malignant epidemic fever that is often found as a sequel to other diseases.

Symptoms.—Whoever has once seen a bad case of purpura will

not easily forget it. In severe cases the horse resembles an elephant, and hence the disease is sometimes called elephantiasis. The nose is bulged out, and bloody water flows from it and from the mouth; the lips and the insides of the nostrils have blotches resembling raisins, and the legs are swelled to an enormous size, but the swelling seems to stop abruptly before reaching the shoulder or stifle. The horse stands constantly in one place, and seems better one day and as bad as ever the next.

Causes.—Various. The disease often occurs after an attack of influenza, or any other debilitating disease, and is aggravated by the surroundings, or by changes of weather. The indications of blood poisoning are prominent.

Treatment.—The patient should be made as clean and comfortable as possible; his food should be gruel, boiled oats and linseed mash; an injection of warm soapsuds, containing three or four pints of raw linseed oil, should be given, and repeated two or three times if constipation is persistent. Give half an ounce of pulverized chlorate of potash in a pint of oatmeal gruel or in the drinking water twice a day, and give nitre-water for drink, as before recommended.

ANTICOR.

This is a disease which is not very common, but we have met with a number of cases, which, in many instances, have manifested very alarming symptoms.

Symptoms.—A large swelling appears on the breast, and extends backwards under the belly, sometimes as far as the sheath, making the horse very sore and stiff. The disease occurs most frequently in colts or young horses, and sometimes while at pasture.

Causes.—Disordered condition of the blood, occasioned by hot weather, exposure to wet, over-feeding, etc.

Treatment.—Remove the cause, adopt a moderate and cooling diet; give nitre-water for drink; foment the breast daily with hot water, and if an abcess should appear open it freely.

ANASARCA.

This disease is also a form of dropsy which is manifested externally, and is sometimes called water farcy. It is, however, an entirely different disease.

Symptoms.—External swellings having a puffy appearance on the lips, chest, belly, sheath, legs, etc., which are increased by idleness, and disappear with exercise.

Causes.—Idleness, want of exercise, high feeding, etc.

Treatment.—Give plenty of exercise, regular and moderate feeding on grass or soft feed, and if this is not sufficient give nitre-water for drink. Sometimes this disease is referable to a weakened condition from former disease, when more liberal feeding becomes necessary, and a teaspoonful of pulverized copperas may be given once each day with benefit.

LYMPHANGITIS.

This common disease is an old acquaintance with a new name—big-leg, weed, shot o' grease, planet-struck, milk-leg, etc., are among its popular appellations. It is quite time we had a reformation.

Symptoms.—When the owner goes to his stable in the morning and finds one of his horses that was all right the night before, now with a hind leg swelled as large as a small churn, the swelling reaching from the foot to the groin, that is lymphangitis.

Causes.—Too much corn.

Treatment.—Bran-mash mixed with nitre-water for feed, and a daily drench for three days of fifteen drops of the German tincture of aconite, given in a soda-water bottle full of water. Give no grain until recovered.

DROPSY.

Under the name of dropsy we will include swellings beneath the chest and belly, swelled legs and sheath, yellow water, etc.

Symptoms.—Diffused swellings in different places, sometimes soft, and sometimes more like dough in consistency, so that when pressed with the finger they retain the impress for a short time, accompanied with general debility and weakness.

Causes.—Various: cold and wet, filth, neglect and bad management, weakened condition resulting from some other disease. It most frequently occurs in old horses, and also follows foaling, checked perspiration, diseased liver, etc., etc.

Treatment.—The treatment should be directed to building up the system. Let it be done by “doctoring” and “dieting.” Give at the noon feed three quarts each of oats and bran, and shake over it one day a heaping teaspoonful of pulverized copperas, and the next day the same quantity of pulverized nitre, and so on alternately for a month or six weeks. Wet the feed slightly. For swelled legs and sheath exercise is wanted.

DEBILITY.

Debility may be either permanent or temporary. It is generally the result of some previous disease, such as influenza, pneumonia, pleurisy, etc., and needs careful attention.

Symptoms.—The symptoms are plain enough; the patient manifests no spirit nor ambition, and is generally poor looking and weak.

Causes.—Hereditary taint, cold, dampness, filth, neglect, and other diseases.

Treatment.—Good feeding and care. It is certainly the height of absurdity to bleed or physic away the small amount of strength that the animal may have left.

GREASE HEEL.

In its early stages this disease is called *scratches* and *cracked heels*. It has always been attributed to filth and neglect, but we have found it frequently occurring among horses that were apparently well cared for in every way.

Symptoms.—In the early stages heat and redness of the skin around the heels are noticeable; a little later, tenderness and slight cracks may be seen, and eventually the swelling, redness, cracks and inflammation extend above the fetlock, or perhaps half-way up the leg, and the hair covering the parts stands out like the bristles of a brush.

Causes.—Disordered state of the blood, over-feeding, feeding on damaged hay, washing the legs and leaving them to dry in a draft, etc., etc.

Treatment.—Make a strong bag, just wide enough to draw over the foot and long enough to more than cover the fetlock. Put this on at night, tie at the top of the hoof, and fill up with flaxseed meal poultice and tie again above the fetlock; in the morning wash off with warm water, and apply a mixture of one ounce of sulphate of zinc in a pint of glycerine, first dissolving the sulphate in a little warm water.

FISTULA.

A swelling on the top of the shoulder or *withers* which terminates in a running sore.

Symptoms.—A sore swelling, just in front of where the saddle comes, and often producing lameness.

Causes.—Bruises from badly fitting saddles or harness, or from rolling; bites of other horses, blows, etc.

Treatment.—When the swelling first appears bathe with hot water three or four times a day; this may disperse it, and save a great deal of trouble. If neglected at this time matter and sinuses will form, and the case should then be given to a veterinary surgeon.

SHOULDER SPRAIN.

Symptoms.—The horse is disinclined to move, drags his toe on the ground without raising his foot, and the shoulder is generally sore and tender. Stepping over a log will decide it.

Causes.—Slipping sideways, especially in muddy weather or on ice; rolling in the stall; slips or falls in running or playing.

Treatment.—The most essential part of the treatment is absolute rest in the stable. If there is much swelling and inflammation, hot water bathings should be diligently employed. A mixture of vinegar, whiskey and water may be used in bathing.

CAPPED ELBOW.

The point of the shoulder, on the back part, is commonly called the elbow; uncommonly, the *olecranon*. It is liable to injury from the heel of the shoe when the horse is lying down.

Symptoms.—At the point designated a round swelling of considerable size appears, which is hot and tender, and is sometimes called a *shoe-boil*. The sympathetic inflammation is sometimes quite extensive, and is followed by a hard, callous tumor.

Causes.—Injury from the heel of the shoe.

Treatment.—In the early stage the diligent application of hot water, three or four times a day, an hour each time, will sometimes be sufficient; but after it becomes callous a *seton* may be passed through it, or, what is better, the tumor may be dissected out by a competent veterinary surgeon.

SPEEDY CUT.

This is a dangerous accident of frequent occurrence. Horses that lift their legs high in trotting are very apt to strike the opposite leg just below the knee, and the sudden pain is so excessive that they drop as if they were shot.

Symptoms.—A swelling is seen just below the knee on the inside, and the horse flinches when it is pressed upon. There may, or may not be a small scar, showing where the edge of the foot or shoe has struck. The accident usually occurs when speeding, and especially in turning.

Causes.—These may be carelessness, malformation, excitement, sudden start from being struck with the whip, etc., etc.

Treatment.—Bathe diligently with hot water until all inflammation has subsided. At night apply tincture of arnica. Care must be taken that neither hoof nor shoe project too far inwards. The shoe should be beveled and rounded inside.

BROKEN KNEES.

Slight cases of broken knees are not of much importance; but severe cases claim our diligent attention. In case of the joint being exposed death frequently results.

Symptoms.—In some instances the hair only is torn off, leaving a white patch. In other cases the roots of the hair are destroyed, and in still more severe cases the joint is exposed, and the joint oil (synovia) escapes.

Causes.—Falls on the road, due to carelessness, tender feet, corns, and navicular disease, and generally happening in descending hills, or when traveling on stony ground.

Treatment.—In the first case, bathe with warm water, and apply at night equal parts of tincture of arnica and water. In the second case, use the compound tincture of benzoin during the day, and a poultice of linseed meal at night. In the third case, dust the wound two or three times a day by means of a dredge-box with a mixture of pulverized charcoal, slaked lime and wheat flour, and keep the horse from moving as much as possible.

SPRAIN OF THE BACK SINEWS.

The back sinews are those which extend from the horse's knee down to the foot. The sinew passes through a sheath, and its injury by sprain is very painful.

Symptoms.—The horse is in great pain, and cannot put his foot down flat, but rests it on the toe. The back part of the leg is swollen, hot and tender, and the leg is quite round.

Causes.—Slipping backwards very suddenly; hard pulling; getting cast in the stable, or violent efforts of any kind.

Treatment.—Absolute and long continued rest in the stable, no

going out for any purpose; hot water bathing, often and diligently applied; whiskey and water, equal parts, may be sponged on gently at night, and a high-heeled shoe should be placed on the foot to relieve the tension. If there is much fever, three ten-drop doses of the German tincture of aconite, mixed in a soda-water bottle full of water, may be given during the first forty-eight hours.

RUPTURE OF THE SUSPENSORY LIGAMENT.

This very serious and painful accident is, happily, not common, but when a case is once seen it will not readily be forgotten.

Symptoms.—In giving the symptoms I will describe a case that came under my notice a few years ago. A gentleman came for me in an excited manner, and I immediately responded. The patient, a fine five-year-old mare, was standing in the middle of a large stable floor, with her front toes turned upward, and the weight of her body resting on the fetlocks; she was thus trying to steady herself from falling, while the sweat was pouring from her in streams, indicating the greatest agony. I at once had a deep straw bed made under her, and the poor animal dropped upon it. I then went to my office for some requisites, but upon returning after half an hour's absence, found two men busy rubbing the mare's *belly* with mustard and vinegar, they having already drenched her for *bots*! This was done with the full approval of the owner, and is an example of the too common lack of common sense in the treatment of horses.

Causes.—These are, in many cases, unaccountable. The accident frequently occurs to race-horses and hunters, but rarely happens during moderate action. The above case, however, occurred after a quiet drive of four miles.

Treatment.—As the horse will remain down for some time he must be turned over occasionally to prevent chafing. He should be fed on soft feed, and should have nitre-water for drink. The legs should be kept moist and cool by bandages of flannel saturated with a mixture of equal parts of whiskey, vinegar and

water. Hot water bathing may well be resorted to while the swelling and tenderness exist. Long rest and quietude are very essential. Three or four ten-drop doses of the German tincture of aconite should be given during the first forty-eight hours.

RING-BONE.

Ring-bone is an exostosis, or bony tumor, affecting either the upper or lower pastern bone, but generally occurring at the coronet, or upper edge of the hoof.

Symptoms.—A swelling, attended with heat, and frequently with lameness, at the point affected.

Causes.—Hereditary taint; sprains of the coffin-joint, concussion, etc.

Treatment.—The cure of ring-bones and spavins has for many a day been the harvest-field of quackery, and it is time that horse-owners should be a little better posted on the subject. It is evident that when this bony tumor has once been formed the diseased parts can never be restored to their original integrity; restoration to usefulness, arresting the further progress of the disease, and freeing the horse from lameness, is all that can be looked for, and this is the construction that should be put upon the word *cure*. This restoration can often be effected by simple hot water bathing, if applied diligently when the disease first appears; but if this opportunity is lost the disease proceeds to its natural termination, the joints are “welded” together and become perfectly immovable; lameness is succeeded by simple stiffness, and the horse is *cured*. Blistering applications of various kinds are useful in accelerating the natural process and putting a stop to lameness.

LAMINITIS.

This disease of the horse's foot is better known by the name of founder. It consists in inflammation of the tendons, muscles, laminæ, etc., of the feet. It is generally confined to the fore feet.

Symptoms.—At the onset of the disease the horse stands stiffly in one place; his tail quivers; his flanks heave; he sweats profusely; seems to wish to lie down, but does not know how to go about it, and is evidently in great pain. If forced to move he will in desperation catch up his hind legs suddenly and walk off rapidly. If the horse succeeds in lying down he will manifest less pain, but his feet, both around the crust and at the sole, will be found very tender and sensitive, with more or less heat and inflammation around the pastern, and especially at the coronet.

Causes.—Long and hard drives or other overwork; plethora; sudden chills, as from driving into cold water when in a state of perspiration; over-eating or drinking, etc., etc. It is also the sequel of other diseases.

Treatment.—In the beginning of the attack, when the horse is feverish and excited, give him twenty drops of the German tincture of aconite in a soda-water bottle nearly filled with water. Two more doses of ten drops each may be given at intervals of two hours. Give him a good, soft bed; bathe his feet with hot water, and wrap them in woollen cloths wrung out of water as hot as can be borne; cover with a dry cloth, and leave the cloths on. Give soft feed only, and all the nitre-water he will drink.

NAVICULAR DISEASE.

This is a disease of the horse's fore feet, and is the cause of a great deal of worry to the owner, who fails to understand why or where the horse is lame.

Symptoms.—The horse attracts our notice by the stumpy way in which he sets down one or both fore feet. He stumbles, even on level ground, and his shoes are found worn and thin at the toe. The muscles of his breast begin to shrink, and then he is said to be *chest foundered*. His legs and feet fail to show any blemishes; the owner is puzzled and disgusted, and in this state of mind is very likely to doctor him for the *bots*. The horse suddenly seems to get well, and may continue free from lameness for a few days or weeks, when he suddenly becomes as lame as ever. Then some

one suggests that the horse is "sweenied," and, on examination, the skin is found sticking fast to the shoulder, and this settles the matter once more; the owner rejoices that he has at last discovered the source of the trouble, and forthwith a silver quarter dollar, or a piece of leather, is inserted beneath the skin, and at the end of a week or two all is well again. After a while, however, the old trouble returns, and again the horse is subjected to blisters, setons, and any or all of the liniments in vogue, or the tissue beneath the skin may be inflated by the blow-pipe or quill, and the rounded appearance once more makes the owner think that his troubles are at an end when, lo! at the end of a week or two, the horse is again *in statu quo*. All this waste of time and vexation of spirit has resulted from "doctoring" the horse's leg at the wrong end!

Causes.—Concussion, especially in horses with short pasterns; long drives on hard roads; sudden action after long inaction, etc.

Treatment.—Give the case to a veterinary surgeon, or take off the shoes and turn the horse out for a year or more.

THRUSH.

Thrush is a disease of the frog of either the front or hind foot, and, although it seldom causes lameness, it should never be neglected.

Symptoms.—On lifting the horse's foot a foul odor is perceived, which comes from the cleft of the frog; a dirty discharge also emanates from the same source.

Causes.—This disease is generally to be attributed to too much moisture, either in or out of the stable. A filthy barn-yard is a first-rate place to breed it. It often results from standing on floors saturated with urine and filth. Coarse, fleshy horses are most liable to it.

Treatment.—Put the horse in a clean, dry stall; stuff into the cleft of the frog at night a piece of tow, upon which has been spread a mixture of equal parts of tar, lard, and pulverized blue

vitriol (sulphate of copper), this stuffing to be taken out when the horse goes to work.

CANKER.

This is an advanced stage of the preceding disease. It occurs generally in the hind feet, and is very difficult to cure. It is sometimes called running thrush, in its first stages.

Symptoms.—A very foul-smelling discharge comes from the cleft of the frog; this being neglected the disease gradually spreads beneath the sole of the foot, and sometimes causes a separation of the whole of the sole from its attachments.

Causes.—Hereditary taint and bad management.

Treatment.—First give a dry stall. If corn has been used for feed, change to oats for a while. Take a piece of cotton batting, double it, and cut it to fit the inside of the shoes. This should be kept damp with a mixture of one drachm of chromic acid in a quart or more of water. It may be kept in place by pieces of hoop-iron fastened across the foot between the shoe and the hoof. It should be renewed two or three times a week.

QUITTOR.

Quittor is a fistula of the foot, occurring in the coronet, and generally inside. It may become a very troublesome affair if neglected.

Symptoms.—The horse becomes very lame, and on examining the foot a small running sore is found in the coronet, which is very sensitive to pressure.

Causes.—Bruises, treads, pricks in shoeing, neglected corns, gravel, etc., etc.

Treatment.—Cut the hair away from the opening, cleanse it with warm water, and by means of a syringe having a small nozzle inject or rinse it out three times a day with a mixture of corrosive sublimate, one drachm, alcohol, one ounce, Goulard's extract, one half drachm. This should be prepared by a druggist.

A rubber syringe is the best. If gravel is the cause, free vent must be given below.

CORNS.

What are called corns, in the horse, are small, soft spots, generally of a reddish hue, situated inside of the heel, between the bars of the hoof and the crust or quarters. Compression upon these spots seems to cause great pain to the animal.

Symptoms.—Lameness, which disappears when the corns are pared down so that the shoe does not press upon them, but reappears with the growth of the sole.

Causes.—I am not aware that unshod horses ever have corns; there may be some exceptions, but I think the rule holds good; we have, therefore, to conclude that shoeing is the cause of corns, and probably of other diseases as well. Shoeing may be said to be a necessary evil, the general idea being that all horses must be shod. From this idea I dissent. I believe that if horses were worked without shoes from colthood, they would be able to stand the grinding and wear of gravelled roads, or even the rough pavements of cities. "Custom is second nature."

For the last five years I have driven an unshod mare. When purchased, she was the subject of navicular disease, and for two years I tried several different kinds of shoes with but little benefit. I then concluded to see what unassisted nature would do, and so turned the mare out for a year, rounding off the edges of the hoof occasionally with the file. The frog assumed its natural proportions, the heels expanded, and the whole foot was very much improved, and has given no trouble since. Let it be distinctly understood, however, that it will not do to take off your horse's shoes and then drive him the next day without shoes. Nature must have time to accommodate herself to circumstances; her operations are slow and deliberate. Neither will it answer to turn into a soft marshy pasture, as the feet must be gradually accustomed to traveling on hard, rough ground.

If we examine the feet of other domestic animals we shall find

that they are provided with soft, elastic cushions, which largely prevent the jarring of the upper parts of the body in traveling. In the unshod colt the frog serves the same purpose, but the blacksmith considers it a part of his business to cut away this cushion, thus throwing the whole weight of the animal upon the comparatively unyielding crust; more than this, the shoes are usually left on so long that the walls of the crust are drawn together, thus pinching the foot and giving sufficient cause for the formation of corns.

After what has been said it may be asked, "Can we do without having our horses shod?" To this I answer, No; it is a necessary evil, and we must make the best of it; but I am of the opinion that one half the horses in common use, the world over, need no shoes. Horses hauling heavy loads in cities or on very hilly roads, or where much backing is required, or sudden pulls in slippery places, and under other special circumstances, call for shoeing; but horses kept for driving, for business or pleasure; horses on farms, or those whose work is moderate any where, require no shoeing. A little care is needed to keep the outer rim of the hoof rounded off with the file (not rasp), and to keep it elastic and tough.

Treatment.—All kinds of remedies have been used for the cure of corns, but I have none to recommend, except to take off the horse's shoes, have the rims of the hoofs rounded off with the file, and let him run free for a year. He will be all right then, but if you wish to have the corns back again, put on shoes.

SAND-CRACK.

Horses sometimes have a perpendicular crack or split on the inside of the front hoof, or on the front of the hind foot, which is called a sand-crack or toe-crack. This is sometimes but an inch in length, and at other times extends to the coronet. If the crack be deep, it is liable to be attended with considerable lameness.

Causes.—Blows on the inside of the front hoof, which is its weakest portion, or hard pulling in case of toe-crack.

Treatment.—This used to be a very troublesome affair, but recently a particular kind of forceps and clamp have been invented which effectually closes the crack until it grows out. These instruments may be obtained of Reynders & Co., 303 Fourth avenue, New York city.

INFLUENZA.

This disease is now generally known under the names of epizootic, catarrhal fever, and pinkeye. It has afforded some excellent lessons to intelligent horse-owners, and some convincing proof of the triumph of common sense over quackery. Horses that were bled, physicked, blistered and rowelled, *died*; horses that had to swallow the various “conundrums” and specifics in vogue at the time had a narrow escape; those that were intrusted to nature and to simple remedies did well.

Symptoms.—The horse is dull and stupid; lacks appetite; has a soft cough; his legs are somewhat swelled; he does not lie down much; the insides of his eyelids are of a yellowish-red color; there may be a slight discharge from the nose; prostration and debility are marked characteristics, and recovery is generally slow.

Causes.—Not known.

Treatment.—If some kind-hearted old woman had been made commander-in-chief during the visitation of the epizootic, it would have been a good thing. When she saw the poor horse could not eat she would have boiled or soaked his oats or corn; seeing his legs were swelled she would have ordered them rubbed with goose-grease; she would have kept him comfortable, and would not have allowed him to work until he was quite well. Although a “doctor,” I cannot suggest any improvement.

BRONCHITIS.

This is inflammation of the bronchial tubes, generally extending up along the windpipe, and is rather a common disease, and attended with considerable danger.

Symptoms.—The most prominent symptom is the cough, which is loud and hoarse, and comes on in spells; the breathing is increased—sometimes very much; the horse hangs his head; his mouth dribbles, and he is generally thirsty; as the disease progresses there will be considerable discharge from the nostrils.

Causes.—Facing storms; cold, wet weather; chills from standing long uncovered, or from standing in cold drafts.

Treatment.—Give soft food, linseed mash and nitre-water; keep the horse comfortable, and keep the nostrils clean with a sponge and tepid water.

PNEUMONIA.

This is inflammation of the lungs, and is commonly known as lung fever. It is a very serious disease, and requires our careful and diligent attention. Young, fat, full-blooded horses are the most frequent victims. Why some are attacked and others not, under the same circumstances, is a mystery.

Symptoms.—The disease usually begins with a shivering, for which no cause is apparent (as on a hot day); the shivering fit is followed by dullness; the horse stands with his head down; his legs and ears are cold; the breathing becomes short; he looks around at his side, but does not lie down; he seems afraid to cough, and a reddish looking discharge may come from his nose; his nostrils expand as if he had been running rapidly; he straddles with his fore legs, as if to balance himself; his ears droop, and at last he reels over and drops dead. The duration of the disease is six or seven days.

Treatment.—I am inclined to the belief, based upon repeated observation, that in these cases "the first blow wins the battle." As soon, therefore, as any shivering is observed for which no reason can be assigned, give ten drops of the German tincture of aconite in a soda-water bottle nearly full of water. Give of this five doses, two hours apart, reducing the quantity by one drop at each dose. After that give nitre-water for drink; rub his legs frequently; keep his body comfortably warm, and give plenty of fresh air.

PLEURISY.

This is inflammation of the membrane which lines the chest, and also covers the lungs, on one or both sides.

Symptoms.—The symptoms differ from those of pneumonia, chiefly in there being a tenderness to the touch in the side and flanks in the case of pleurisy, which is not so noticeable in pneumonia. The pulse is full in pleurisy, but weak in pneumonia. The interior of the nostrils is fiery red in pneumonia, but of nearly normal color in pleurisy.

Treatment.—Woollen cloths should be wrung out of hot water and applied to the sides and chest, the application being repeated until relief becomes evident, then the skin should be thoroughly dried and the horse blanketed. In other respects treat as for pneumonia.

HEAVES.

Most horsemen recognize a strong resemblance between heaves and asthma.

Symptoms.—A peculiar jerking of the flanks in breathing, which seems to abate after the horse has traveled a mile or two. It is generally accompanied by a suppressed, consumptive cough.

Cause.—Indigestion.

Treatment.—The treatment of the heavy horse is suggested by the cause given. Don't let him stand all day grinding corn-stalks, nor clover hay, nor don't let him drink three or four buckets of water at one time, and then put him to work. Run up two or three flights of stairs directly after you have eaten your dinner and you will know how it is yourself. Feed more grain and less hay, and give only one bucketful of water at a time, and not more than three or four during the twenty-four hours.

SPASMODIC COLIC.

I believe that more horses die of colic than of any other disease; and yet it is lightly spoken of, and most horse owners seem to

think that "anybody can cure the colic." It is, however, a very serious and fatal disease.

Symptoms.—The horse apparently feels a sudden, sharp pain in his bowels; he looks around at the place where he thinks it is. Another pain comes, and he kicks at his belly. Another, and it cramps him so severely that it compels him to drop down, where he rolls and knocks himself about fearfully. He is not swollen, but rather gaunted in severe cases. He sweats profusely.

Causes.—In this kind of colic, cramps in the bowels may originate in constipation, in sudden chills, in drinking cold water when too hot, or from driving into water when hot. Constant feeding on the same kind of food and a predisposition to the disease, may also be mentioned.

Treatment.—Give the horse a large, open lot to roll in; give, as soon as opportunity affords, twenty drops of the German tincture of aconite in a pint of water; follow with an injection of a bucketful of blood-warm water containing a handful of salt. If relief does not immediately follow, give, in half an hour, ten drops of the aconite, and the same dose in another half hour. Should no improvement be seen, give, in another half hour, two ounces of laudanum, mixed in a pint of raw linseed oil. The injections should be continued frequently.

FLATULENT COLIC.

Symptoms.—The horse is more or less inflated with gas; so much so, in severe cases, that he seems ready to burst. If on his feet, he stretches his nose forward, trying to get all the air he can, and either stands still or moves around in a circle. If he lies down it is only for a moment, as he cannot bear the pressure. He sweats profusely.

Causes.—The causes are chiefly working the horse directly after feeding and watering, especially if he is a greedy feeder; feeding constantly on corn; frequent watering in hot weather; giving green corn, brewer's grains, etc.

Treatment.—Where there is every reason to think that the

stomach and abdomen are distended to their utmost capacity, the propriety of giving medicines of any kind has always seemed doubtful. Injections, that are such a great help in other cases, appear useless here. Cold water, put on with woollen cloths, and exercising moderately, seem the most rational treatment. We are expected, however, to do something, right or wrong, and I will refer the reader to the following time-honored cures: Whiskey, sweet milk and molasses; whiskey and pepper; vinegar and saleratus; indigo, whiskey and laudanum; mackerel brine, whiskey and sweet spirits of nitre; hen's dung, vinegar and baking powder; spirits turpentine and laudanum; chicken's inwards; ash lye; pumpkin-seed tea; sage tea, etc., etc. For external applications we have mustard and vinegar, fence rails, coal oil, broom handles and charms.

ENTERITIS.

This is acute inflammation of the bowels, and is a very formidable disease. The ordinary observer sees no difference between it and spasmodic colic, but there is an important difference.

Symptoms.—Enteritis is generally gradual in its approach; the horse seems feverish and the ears and legs are cold; the belly is tender, and the horse manifests pain when you press on it; the pain continues, and the horse gets weak quickly; he stamps and paws the ground with his fore feet, breathes quickly, sweats in spots, and has a haggard, distressed look. In colic, motion and friction of the parts afford relief, in inflammation it aggravates the pain; colic has intermissions; in inflammation the symptoms are continuous.

Causes.—The same as those of colic. Inflammation is often a sequel to colic.

Treatment.—First give twenty drops of the German tincture of aconite, as previously directed; next an injection of warm water and salt. In twenty minutes another dose of ten drops of aconite. If there is no improvement within half an hour, give two ounces of laudanum in a pint of warm milk, or in half a pint of raw lin-

seed oil mixed in half a pint of lime water. Fomentations of hot water are very useful.

CONSTIPATION.

Constipation in horses is quite a serious matter, and should not be neglected. It is the original cause of many diseases, and the consequence of others.

Symptoms.—Scantiness of excrement, accompanied by straining, and sometimes by twinges of colic.

Treatment.—Change the food to bran mash, cut grass or clover; or other soft food, until the stools become reasonably soft. In urgent cases the use of injections of warm soapsuds, raw linseed oil, or warm water and salt, is far better than the giving of any strong purgatives, since these are generally followed by a reaction which only aggravates the disease.

DIARRHŒA.

This disease is often simply an effort of nature to get rid of something injurious.

Symptoms.—Frequent expulsion from the bowels of fluid or half fluid discharges, resulting in weakness and prostration, loss of appetite, etc.

Causes.—Disease of the liver, worms, drinking too much water, eating heartily of new corn or hay, poisonous plants, over-fatigue, etc.

Treatment.—In the early stages of the disease it may often be checked by changing the feed; if this proves ineffectual, give a quart of raw linseed oil and two ounces of tincture of opium. If no improvement is seen within a day or two, give a quart of flour gruel, containing two ounces of pulverized chalk and two ounces of laudanum. These large doses are to be given with a soda-water or tin bottle, a little at a time, the horse's head being simply held up gently, not hoisted to a beam with ropes.

BOTS.

When horses are seized with the colic the owner and his neighbors, or some over-smart *doctor*, frequently think "the bots" are working on him; and it is far safer for the bots to work on him than the doctor, for they wont hurt him, but the doctor might.

Symptoms.—None reliable.

Causes.—The bot-fly.

Treatment.—Should be for colic. The larvæ of the bot-fly, which are found in the stomach of the horse at certain seasons, are perfectly harmless. They live there for about eight months and then vacate the premises; and all the wonderful stories of their eating holes in or through the coats of the stomach are absurd. They might possibly do harm when very numerous, by interfering with the action of the glands of the coats of the stomach, but not otherwise.

WORMS.

The stomach and bowels of the horse are liable to be infested with worms of different kinds, and sometimes in large numbers.

Symptoms.—The horse is generally poor and hide-bound; he has a staring coat; is subject to slight colic; and beneath his tail may be seen a slight putty like discharge. He is generally weak and listless, and often pot-bellied.

Causes.—Constant feeding on coarse food; poverty; neglect; filth.

Treatment.—Feed very liberally on good, rich food, sound oats or corn; give water regularly three times a day, but only one bucketful each time; three times a week give a tablespoonful of finely pulverized copperas in a quart of meal. Feed no musty fodder of any sort.

NEPHRITIS.

Inflammation of the kidneys, according to the popular belief, is a very common disease, but this belief is quite erroneous. Colic, paralysis, lumbago, lung fever, sprains and even spavin are often taken to be "trouble in the water works."

Symptoms.—There is one marked symptom which will guide the attentive observer; the horse is stiff in his movements, and straddles out sideways—not backwards—with his hind legs; he is disinclined to move or to lie down; he passes urine in small quantities; the urine is sometimes bloody and always dark colored; he shows pain in turning around, and looks anxiously at his flanks.

Causes.—Cold, wet, filthy stables; large quantities of rough or damaged fodder; cold drafts; drinking too much water at one time; exposure in stormy weather, and general bad management.

Treatment.—Remove the patient to more comfortable quarters, and remember that good nursing is half doctoring. If he seems distressed, feverish, and breathes rapidly, give ten drops of the German tincture of aconite; and this dose may be repeated four times, at intervals of four hours. His food should be boiled oats mixed with bran, and a little sweet hay. A quart or more of linseed tea should be added to every bucketful of water given.

CYSTITIS.

Inflammation of the bladder, like that of the kidneys, is not so common a disease as is generally supposed.

Symptoms.—The horse is feverish and restless, with loss of appetite, and occasional colicky pains. There is great difficulty in passing the urine, and the quantity passed is small. There is tenderness over the loins, and the horse looks backward frequently. His hind legs tremble, and are straddled wide apart.

Causes.—The most frequent cause is a morbid desire to doctor horses for urinary diseases which have no existence, consequently the organs are kept in an irritable state, and it takes but little to

start an inflammation. The practice of feeding salt and ashes results in much injury, and should be abolished; I am well aware that this doctrine will receive the "cold shoulder," but facts are stubborn things, and I hope that unprejudiced men will try the experiment of feeding no salt. It should be remembered that horses can be taught bad habits as well as their masters. We all know how nice and particular horses are with reference to anything greasy, but I have seen a three-year-old colt, in a butcher's shop, eating a raw beefsteak, with as much relish as a bull dog. They can also acquire the habit of chewing tobacco, and drinking beer and whiskey.

Treatment.—When the fever is high and the horse seems in pain three doses of the German tincture of aconite (ten drops each) may be given at intervals of one hour; woollen cloths, wrung out of hot water; should be kept across the loins until the horse is well-steamed; if the legs are cold they should be well rubbed; a quart of linseed tea should be given in every bucketful of water drank, and the food should be bran mash. By introducing the greased arm into the rectum, and gently pressing the bladder backwards, some urine may be evacuated, which will give relief. The bladder is beneath the bowel, and can be easily felt, if full. An injection of warm water and oil or melted lard will do good service.

STRANGURY.

This is difficult or painful passing of the urine, which may arise from various causes.

Symptoms.—The symptoms are much the same as in inflammation of the kidneys. The disease is mostly seen in connection with colic, lockjaw, staggers, palsy of the bladder, constipation, foul sheath, stricture of the urethra, or sores and dirt on the penis, etc.

Treatment.—The treatment should first have reference to the cause. The free use of linseed tea, and frequent injections of blood-warm water, containing either Belladonna or opium (tinc-

ture), three or four ounces in a bucketful of water, a quart to be given at each injection, and spreading of cloths wrung out of hot water over the loins, are often beneficial. Two or three ten-drop doses of the German tincture of aconite may be given at intervals of an hour.

DIABETES.

This disease is characterized by excessive discharge of urine and great thirst. A horse affected with it soon runs down in condition, and it often lays the foundation for other diseases.

Symptoms.—The horse gradually loses flesh and strength; the appetite begins to fail, or is depraved; he is inclined to lick the walls of the stable, wagon-wheels, or anything convenient; the urine is clear, like spring water, and the stall is constantly saturated.

Causes.—Excessive use of salt; damaged hay; the sequence of other diseases.

Treatment.—Good feed and good care.

JAUNDICE.

Diseases of the liver are not very common in horses. The cases which occur are chiefly found in the southern states. Excepting jaundice, they are rather difficult of diagnosis for the general reader.

Symptoms.—The horse has a dull, heavy look; the whites of the eyes have a yellow appearance, and in severe cases this yellowish tinge is seen in every place where the skin is not covered with hair; the dung-balls are small, hard and black, showing constipation, and the appetite is very delicate.

Causes.—Idleness, or want of sufficient exercise, with constant feeding on rich food, and confinement to dark stables. The disease is generally found in cities.

Treatment.—Take of epsom salts, Glauber's salts and common salt, each one pound; essence of ginger one ounce; mix in a gallon of warm water, and give a pint morning and night until

the bowels seem moderately affected; change the food to bran mash or cut grass.

HEPATITIS.

This is inflammation of the liver, and is not a very common disease, except among over-fed, pampered horses.

Symptoms.—Listlessness of manner; dullness of the eye; dainty appetite; constipation; and as the disease progresses the insides of the mouth and eyelids become yellow, or else whiter than common.

Causes.—Idleness; too much grain; dark stables, etc.

Treatment.—Change the above conditions gradually; feed moderately on soft food—especially grass; if this is not obtainable, give wet hay and bran mash. Nitre-water may be given for drink for a week or two.

PALPITATION OF THE HEART.

This disease is better known as *thumps*, and is sometimes mistaken for *spasms of the diaphragm*, and *vice versa*. The distinction is practically of no importance.

Symptoms.—The horse seems agitated, as if alarmed at the violent beating of the heart; that organ seems to bang against the inside of the ribs, and can be heard for quite a distance. The disease is of most frequent occurrence in horses of a nervous temperament.

Causes.—High feeding; more frequently long journeys; hard pulling; rapid driving after idleness; rapid or long continued exertion in warm weather.

Treatment.—Simply give rest and quietude until the horse is quite recovered.

RHEUMATISM.

Symptoms.—Very much the same twistings and gruntings—except the swearing—that are manifested in the human patient.

Sometimes there are swellings, sometimes not. The shifting character of the disease is the same as in man.

Causes.—Changes of weather; damp beds; heredity; the sequence of other diseases; old age, etc.

Treatment.—Salicylic acid has been highly recommended of late; I cannot say much for or against it. Coal oil is handier. Give two tablespoonfuls, once a day, mixed in oatmeal gruel and rub the affected parts with the same.

HIP LAMENESS.

Injuries to the hip from sprains, bruises, or serious falls on ice or slippery pavements, or from fracture of the ilium, are known under the name of hip sweeny.

Symptoms.—The horse is very lame behind, and, if compelled to go faster, hops and drags the leg along, touching the toe to the ground as he goes. The muscles of the haunch are shrunken (atrophied), and the horse's condition betokens pain.

Causes.—Heavy and severe falls; slipping on ice, or on uneven, muddy ground; backing heavy loads, and various accidents.

Treatment.—Long continued rest in a box-stall or small enclosure, and the daily rubbing of the affected parts with whiskey, vinegar and water, in equal parts.

STIFLE LAMENESS.

Lameness in the stifle is not uncommon, but a great many mistakes are made with regard to it. Sprains of the fetlock and nail in the foot are often the real causes.

Symptoms.—The lameness is sometimes considerable, and the heat around the joint will always be a sure guide, while tenderness on pressure is additional proof. If the *patella* or stifle-bone has been dislocated it will be seen protruding on the outside of the thigh, and must be pressed back into its place by the hand, an assistant holding up and pulling forward the leg at the same time.

Causes.—Accidents.

Treatment.—Where the stifle-bone has been put out and returned to its place, the horse's head should be tied up, so that he cannot lie down, and left so for fifteen days or more; and the joint should be bathed twice a day with whiskey, vinegar and water, equal parts. Should the bone not have been displaced the head need not be tied up.

HOCK LAMENESS.

The hock-joint is frequently called the gambrel-joint, and is far more often the seat of lameness than is generally supposed. In some cases the whole joint seems perfectly clear of all signs from which we might suspect lameness. This is called occult hock lameness.

Symptoms.—The horse is very lame, and stands with his toe only touching the ground. When made to walk he does so with great difficulty, letting his toe to the ground only for an instant. The hock having been examined and no swelling nor heat being perceived, the horse is supposed to be *stifled* or *strained in the kidneys*. Sometimes the lameness is accompanied with enlarged hock (synovitis), when the horse continually moves his foot up and down, and is evidently in great pain.

Cause.—Not known.

Treatment.—Long rest in a box-stall or small enclosure, with daily bathing for a month with whiskey, vinegar and water, equal parts.

BONE SPAVIN.

This is a disease of the bones of the hock-joint, and is accompanied, in its early stages, with lameness, more or less severe.

Symptoms.—Lameness on first leaving the stable, which disappears as the horse becomes warmed up with his work, but reappears when he starts again after a rest. There may be nothing to be seen to indicate the exact locality of the lameness; the whole surface of the joint may be smooth, and manifest no undue

heat. In a short time, however, a hard lump appears under the joint, and the cause of the trouble is manifest.

Causes.—Heredity; overwork when young; accidents, etc.

Treatment.—First, in my estimation, is the actual cautery with the red-hot iron. Long experience has forced me to this conclusion. The idea of its cruelty is not well founded, for it should be remembered that the pain of the operation is but of short duration, but its benefits are permanent, while it cuts short the pain incident to the deposit of the bony matter which forms the spavin, and is in all respects the quickest, most humane and most efficient remedy. Blistering applications of some kinds do good service, but such also cause pain, sometimes of long duration. Long continued rest, say six or eight months, without any interference whatever, will often allow nature to bring about a cure.

BOG SPAVIN.

This disease is sometimes known as blood spavin, and is one of the diseases incident to the hock joint. It generally occurs in young horses.

Symptoms.—A puffy swelling appears in front of the hock, which is generally prominent, and elastic to pressure, and is not often accompanied by lameness. A slight degree of heat is observable. The swelling may become so large as to be an eyesore.

Causes.—Working too young; accidents, etc.

Treatment.—Long continued rest, with bathing with whiskey, vinegar and water, may give relief; but blistering applications, or the hot iron cautery produce the best results.

THOROUGHPIN.

What is termed a thoroughpin frequently accompanies bog spavin. They are both of similar character, being enlarged bursæ or receptacles for holding the synovial fluid or joint oil.

Symptoms.—On examining the hock-joint a prominence about the size of a half dollar is seen on each side. These apparently extend clear through the joint, hence the name.

Causes.—Overwork; accidents, etc.

Treatment.—The cauterization is the only effectual cure. It should only be applied by a competent veterinary surgeon.

CURB.

Five or six inches below and behind the point of the hock, we sometimes find an enlargement which is best seen by viewing the leg sideways. It often attains a large size.

Symptoms.—More or less lameness accompanies the inception of curb. Heat, swelling, tenderness, and an inclination to step on the toe are also observable. These, with the bulging out of the part, leave no doubt of the cause of the lameness.

Causes.—Rearing, slipping, overwork when young, hard pulling, etc.

Treatment.—If the horse has been shod, the shoe on the lame foot should be replaced with one having calkins an inch higher than the other; constant bathing with whiskey, vinegar and water will be beneficial in the first stages, but if the part becomes callous a mild blister, applied once or twice at intervals of two weeks, may be necessary.

CAPPED HOCK.

A tumor on the point of the hock, seldom accompanied with lameness, but often with considerable swelling, and liable to result in permanent blemish.

Causes.—Bruises from lying down in the stall; kicking; blows from whiffle-trees, etc.

Treatment.—At the first appearance of the tumor, hot water bathing during the day, and rubbing with whiskey and vinegar at night, will be beneficial. Should the tumor become hard and of large size, it should be blistered three or four times at intervals of a week or ten days.

STRINGHALT.

This name is given to a peculiar motion of the hind legs which is pretty well known. The horse afflicted with it is considered unsound.

Symptoms.—A sudden catching up of the hind leg, generally shown when first starting; but the horse may have gone several miles before the owner notices that the leg is being suddenly jerked up in a singular manner. In old chronic cases this jerking is so severe that the horse strikes his belly with his foot and injures himself. It is frequently the best horses that are so affected.

Cause.—Not known.

Treatment.—Useless.

MANGE.

Symptoms.—Constant rubbing against the stall, manger, or other objects, resulting in grinding off the mane and tail, and sometimes the skin as well.

Cause.—The burrowing beneath the skin of a very minute parasitic insect.

Treatment.—On a fine day wash the horse from head to foot with hot soapsuds, applied with a good brush; blanket until dry. Then rub every itching place with a mixture of fish oil, one quart; tar, two ounces; spirits turpentine, two ounces; and sulphur, one pound. Repeat at the end of a week or ten days.

LICE.

Symptoms.—Severe rubbing, and the visible presence of the insects under the hair.

Causes.—Poverty and neglect; allowing hens to roost in the stable, etc.

Treatment.—Turn out the chickens; whitewash the stable; and

at intervals of a week give the horse a good washing all over with a tea made by boiling two pounds of quassia chips in a wash-boilerful of water. Repeat if necessary, and feed liberally.

SURFEIT.

Symptoms.—An eruption, which manifests itself in long-shaped, elastic lumps, more or less diffused over the whole body, but most abundant down each side of the neck. The general health does not seem to be affected.

Causes.—Uncertain. Probably indigestion.

Treatment.—None necessary.

WARTS.

Warts are found on all parts of the body, and are sometimes very unsightly, besides interfering every much with the horse's comfort. Sometimes the wart gets knocked off, and bleeds to an alarming extent.

Causes.—A peculiar condition of the skin, which seems natural to some horses.

Treatment.—For flat warts, twist a piece of cotton round a stick so as to make a small swab; with this rub chromic acid well into the wart. In a day or two a leathery scab will form and drop off, or it may be picked off and the operation repeated until the surface is level. If the wart has a neck, tie a strong thread tightly around it, and in two days another, and so on until the wart drops off, then proceed as above.

HERNIA OR RUPTURE.

This is a rupture of the membrane lining the abdomen and containing the intestines, which permits them to protrude between this membrane and the skin, forming large, soft swellings. This rupture occurs at the side of the belly or flank (as in case of injury from hooking or kicking), it is called *ventral hernia*; if at

the navel, as in young colts, it is *umbilical* hernia; if by the side of the testicles it is *scrotal* hernia.

Causes.—In' addition to the causes mentioned above, hereditary tendency may be mentioned.

Treatment.—As a rule no notice need be taken of umbilical hernia, as it generally disappears before the third year. The cure of other forms should be entrusted only to a competent veterinary surgeon.

ABORTION.

Abortion happens occasionally among fat or over-fed mares, and also among those subjected to extreme neglect.

Symptoms.—The first symptoms are usually a sudden filling up of the udder with a rather swollen appearance of the genitals, and the escape of a small quantity of reddish fluid. The mare seems languid and uneasy, and without appetite.

Causes.—Various. Over-exertion during the latter part of pregnancy; accidents, kicks, and eating poisonous plants.

Treatment.—The mare should be kept alone in a quiet place. No medicine is needed, but her food should be of a cooling kind, such as cut grass or clover, bran mash, etc., and sufficient time should be allowed for recovery.

WOUNDS OR BRUISES.

Wounds may be divided into three classes: The simple incised wound, made by a sharp cutting instrument; the lacerated and bruised wound, and the punctured wound.

Treatment.—Cuts with sharp instruments on any of the fleshy parts of the body need only to be closed with interrupted sutures, if the cut be deep, and then to have the skin beneath the wound kept clean. The surface of the wound should never be washed. Lacerated wounds, having ragged edges or loose flaps of skin, should have the same treatment.

Punctured wounds, such as those made with shot, pitchforks, or nails, should be bathed with warm water, probed for the ex-

traction of foreign substances, and then syringed with a mixture of equal parts of raw linseed oil and spirits of turpentine.

Bruises need hot water bathing by day, and bathing with tincture of arnica, mixed with cold water, at night.

BURNS AND SCALDS.

After the animal is tenderly cleaned off, get a bucket half full of raw linseed oil, and fill up with lime water. Mix it well together and paint the wound thoroughly with a whitewash brush. Another whitewashing may be needed the next day. Give soft feed, and cover with a linen cover without surcingle.

ABCESS—TUMORS.

Symptoms.—In an abcess the swelling is hard and painful at first, but becomes soft and elastic after a while, when it is ripe. Tumors are generally hard and cool.

Causes.—Various. Abcesses, such as poll-evil and fistula, generally arise from bruises. Tumors, such as wens, seem to come on without apparent cause.

Treatment.—As a rule, abcesses, when matter has formed and they become quite "ripe," should be freely opened so as to allow all the pus to escape. Hard or indolent tumors should be dissected out. A mixture of raw linseed oil and spirits of turpentine in equal parts may be injected into the cavities.

GALLS AND CHAFES.

Treatment.—Discard poorly fitting harness of all descriptions, and when the harness is taken off sponge the shoulders and under the saddle, etc., before the skin gets cool, with strong salt water. If large, soft tumors arise on the shoulders, they must be freely opened from top to bottom and the fluid let out. Don't let them close too soon.

ATROPHY OR SWEENY.

This is a wasting away of the muscles, which is known by the name of sweeny when appearing on the shoulder, or hip-sweeny when on the hip.

Symptoms.—There may or may not be lameness. I have seen the most aggravated cases of sweeny in both shoulders, without any lameness. The skin sticks tightly over the shoulder-blade, so that it can scarcely be lifted; the leg is generally slender and the foot contracted.

Causes.—Contracted feet, or other lameness; leaning inwards in double harness, or working anywhere where the pressure is unequal.

Treatment.—Turn the horse to pasture without shoes, and rub the affected part once a day with a mixture of whiskey, one pint; cayenne pepper one ounce.

HIDEBOUND.

This in itself is not a disease, but a symptom of some disease which should be sought for.

Symptoms.—The horse has the appearance of despondency; his hide clings to his ribs, and he is generally unthrifty.

Causes.—Various.

Treatment.—Should you be able to find an honest veterinary surgeon give the case to him. If not, change the feed, and give plenty of it and regular work with good grooming.

LOSS OF APPETITE.

From the stand-point of common sense the horse has greatly the advantage of his master—he won't eat when he is sick, although he may be subjected to the same temptations, and urged to take something nice.

Causes.—This should be investigated. It may be broken teeth; sore mouth or tongue; injuries from the bit; lampas, etc., or it may be due to actual disease.

Treatment.—Remove the cause, if possible.

INDIGESTION.

Symptoms.—Abnormal appetite, shown by eating litter, licking, etc.; rough coat; hidebound; listlessness, etc.

Causes.—Constant feeding on the same food; over-feeding, etc.

Treatment.—Rest on good pasture is the best treatment. If this is impracticable, give greater variety in the food, and give every night for a month in bran mash a tablespoonful of the following mixture: carbonate of soda, four ounces; gentian, four ounces; pulverized nitre, four ounces; pepsin, one and one half ounces.

FOOD AND DRINK.

All green food, in season, is much the best for sick horses. When it cannot be had, *boiled oats* is a good substitute. A peck of oats is put into a wash-boiler filled with water and allowed to simmer four or five hours. When cool, a quart of this mixed with a quart of bran makes a small feed. *Bran mash* is made by pouring boiling water upon the bran, stirring it thoroughly, and allowing it to stand covered till cool. Two or three quarts make a small feed. *Seasoned hay* is made by placing two or three pounds of nice, sweet hay on the floor, sprinkling it with salt water, and letting it soak an hour or two. *Linseed tea* is made by putting half a peck of flax seed into a wash-boiler, filling up with water, and simmering slowly until reduced nearly one half. A quart of this mucilage may be added to a bucketful of water for a drink, or to half a bucket of bran for a feed; use it without salt. *Carrots* are most excellent, given raw if the horse will eat them. *Oat meal gruel* is both food and drink.

ADMINISTERING MEDICINE.

The common method of administering medicine to horses is often attended with serious consequences. It should be borne in mind that the horse is by nature adapted to take his food and drink from the surface of the earth; if you raise his head much beyond the horizontal position he swallows with difficulty, and if it is forced still higher the fluid escapes into the windpipe, and thence into the chest, from which there is no escape for it. A tin bottle holding a quart, and having the neck made smooth with solder, is a good thing for the giving of oil, salts, etc.; a strong soda-water bottle is a good article for the giving of small doses. The head should not be elevated any higher than necessary, and no ropes nor beams are needed. Give only a mouthful at a time, and let him swallow that before you give another. Be careful that you don't force him to cough while his head is raised.

A FEW WORDS TO THE READER.

Suppose your wife or child, or any dear friend, was suddenly taken sick with any serious or dangerous disease, would you send for the blacksmith to prescribe for them? The answer would be an indignant, No! Then how can you think of sending for him, or some one of similar knowledge, to prescribe for your horse? The one animal has two hundred and forty-two bones, the other two hundred and forty-eight, and the other portions of their wonderful and mysterious structures are almost the same. Even those who devote a lifetime to the study of medicine are constrained to acknowledge that they know very little; how, then, can it be possible for those who have never made any study of this science to prescribe intelligently? If, then, you cannot procure a veterinary physician to prescribe for your sick horse, call on your family physician. If he is no "horse doctor," then trust to nature and your own good sense.

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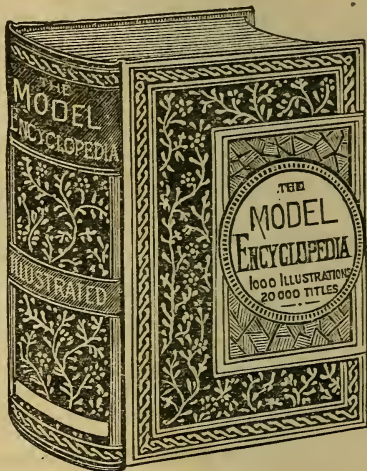
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